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CONTENTS:

A new Variety of Cystopteris fragilis and some old ones. *C. A. Weatherby* 373

Midsummer Vascular Plants of Southeastern Virginia. *M. L. Fernald* 378

Waning of Arceuthobium pusillum at Concord, Massachusetts. *R. J. Eaton* 413

Another New Jersey Station for Najas gracillima. *H. K. Svenson* 414

Two Range Extensions. *A. R. Hodgdon* 414

Notes on Rare Plants of York County, Maine. *Anne E. Perkins* . . 415

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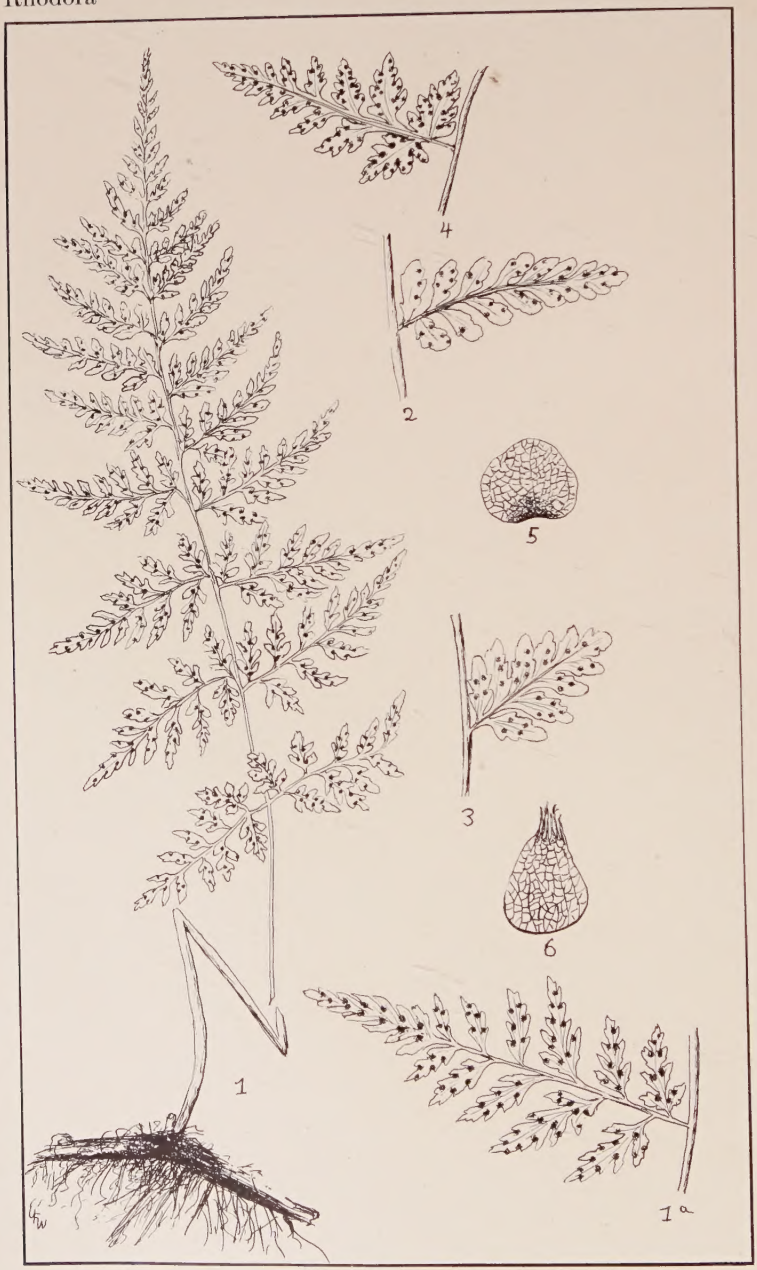

Una F. Weatherby del.

Varieties of CYSTOPTERIS FRAGILIS in eastern North America.

Rhodora

JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 37. November, 1935. No. 442.

A NEW VARIETY OF CYSTOPTERIS FRAGILIS AND SOME OLD ONES

C. A. Weatherby

(Plate 383)

Cystopteris fragilis (L.) Bernh., var. **protrusa**, n. var., rhizomate longe repents, basibus frondium decisarum sparse tantum onusto, apice vix paleaceo ultra frondes viventes 2–4 cm. producto; lamina adulta 11–22 cm. longa, 5–11.5 cm. lata, fere bipinnato-pinnatifida, pinnis ovatis vel ovato-lanceolatis acutis, pinnulis basin versus pinnarum deltoideo-ovatis vel ovato-lanceolatis subacutis plerumque breviter sed evidenter marginato-petiolulatis, profunde pinnatifidis, lobis oblongis obtusis, in lamina juvenili vel depauperata levius incisis obtusioribusque; indusio brevi, c. 0.5 mm. longo, apice leviter lobato vel fere integro. Tab 383, figs. 1 et 5.

Rootstock creeping, only sparsely beset with bases of old fronds, the growing point hardly paleaceous, produced 2–4 cm. beyond the fronds of the season; well-developed blades nearly bipinnate-pinnatifid, 11–22 cm. long, 5–11.5 cm. wide, pinnae ovate to ovate-lanceolate, acute, pinnules toward the base of the pinnae deltoid-ovate to ovate-lanceolate, subacute, usually shortly but distinctly petiolulate, deeply pinnatifid into oblong, obtuse lobes; in juvenile or depauperate blades less lobed and more obtuse; indusium about 0.5 mm. long, shallowly lobed or nearly entire at apex. Southern New York, south in the piedmont and the mountains to Alabama, west to Minnesota and Missouri. Apparently in alluvial or loamy soil in woods. New York: Bloodroot Valley, Staten Island, July 14, 1905, *Dowell* 3884. Maryland: near Cabin John, Montgomery Co., Aug. 1, 1920, *Maxon* 6495. District of Columbia: High Island, June 23, 1897, *Holm.* North Carolina: Old Fort, *W. Faxon;* near Swannanoa Tunnel, Buncombe Co., July 8, 1898, *Biltmore Herb.* 144c. Ohio: without definite locality, *J. G. Lea;* Cambridge, July, 1896, *Caro M. Taylor;* near Cincinnati, June 8, 1888, *J. G. Lloyd.* Indiana: Harrison tp., Wells Co., July 21, 1907, *Deam* 2323. Kentucky: prope North Bend, *Short;* Hawesville, Hancock Co., June 9, 1920, *E. J. Palmer* 17800; near

Vertrees, Hardin Co., Sept. 6, 1927, *Wherry & Pennell* 13632. TENNESSEE: Knoxville, June 5, 1898, *Ruth* 564 (TYPE, in Gray Herb.). ALABAMA: ravine along Black Warrior River, Tuscaloosa Co., April 14, 1929, *E. J. Palmer*, no. 35,373. ILLINOIS: Grand Tower, May 9, 1902, *Gleason*. MINNESOTA: Spring Grove, June 8, 1902, *Rosendahl* 404. MISSOURI: Worth, Worth Co., May 19, 1929, *E. J. Palmer* 36776; Joplin, Jasper Co., May 1, 1922, *Palmer* 21036; Carthage, July 12, 1910, *Palmer* 3018; Creve Coeur Lake, June 12, 1904, *W. W. Lyon*. Specimens from near Knoxville, Tennesse, June 5, 1929, *Wherry & Benedict* and from Muscle Shoals, Alabama, May 8, 1929, *Wherry*, show transitions to var. *Mackayii*.

Var. *protrusa* was detected some years ago by the keen eye of Prof. Fernald and by him was brought to my attention. It is the best marked of the four geographic variants of *C. fragilis* which can be recognized in eastern North America, being generally rather well distinguished by its combination of creeping rootstock, short-petiolulate basal pinnules and short indusium. Except for the transitions by which it is connected with var. *Mackayii* (to be discussed below) and through it with typical *C. fragilis*, it might almost pass for a species. It probably formed at least part of the concept of *C. tenuis*, generally kept up as a species by the English fern-specialists of the mid-nineteenth century—at least, that was usually described as having a creeping rootstock (cf. Moore, Nature-Printed Brit. Ferns, 8° ed., ii. 261 (1859)). The Short and Lea specimens cited above were originally determined as *C. tenuis*. Judging from his description, Milde (Fil. Eur. 153 (1867)) had a specimen of it from Pennsylvania; but it must have lacked a rootstock, for he could find no distinguishing character in it except the short indusium, which he duly noted. Var. *protrusa* is not, however, *Nephrodium tenue* Michx., the nomenclatural base of *C. tenuis;* that, as shown by a photograph of the type before me, is var. *Mackayii*.

The following key attempts to place var. *protrusa* in relation to the other geographic variants of *C. fragilis* in eastern North America. It is presented with the caveat that too much is not to be expected of it. Clear definition in this group is not easy. Leaf-form varies widely both within and between varieties. The characters of the indusium are none too constant and, in any case are hard to make out because of the fragility of that organ and the consequent difficulty of getting good dissections.[1] The key, then, in all probability will not

[1] So much is this the case, that of all the illustrations of *C. fragilis* which I have seen, only those of the always accurate and painstaking Christian Schkuhr truly represent the indusium. The almost scale-like character which he ascribes to *Aspidium tenue*, as he called it, can be perfectly matched in young specimens in the Gray Herbarium. Cf. Schkuhr, Krypt. Gewächse, pls. 53b, 54.

furnish the means of naming *every* specimen in this variable complex; nor does the treatment which it sets forth settle all questions which may arise.[1] But I believe it does indicate real foci of geographic segregation.

a. Rootstock oblique or horizontal, short, or, if elongate, thickly beset with bases of old fronds, the growing point usually conspicuously paleaceous, not produced horizontally beyond the fronds of the season; basal secondary segments usually sessile (subpetiolulate in large fronds of var. *Mackayii*) . . . . *b.*
  b. Indusium relatively large, up to 1 mm. long, more or less deeply cleft at apex; at least the basal secondary segments of the blade not evenly cuneate at base, from nearly orbicular to deltoid-lanceolate . . . . *c.*
    c. Indusium glabrous; plant usually not more than 2.5 dm. in height . . . . . *C. fragilis* (typical)
    c. Indusium sparsely and minutely glandular on the back; plants usually larger, up to 5 dm. high . . . . . var. *laurentiana.*
  b. Indusium about 0.5 mm. long, shallowly lobed or nearly entire: blade often only pinnate-pinnatifid, the basal secondary segments cuneate at base, oblong to obovate, only shallowly toothed or lobed and with broad, rounded apex, if more deeply lobed often lanceolate or oblong-lanceolate . . . . . var. *Mackayii.*
a. Rootstock long-repent, the growing point scarcely paleaceous, produced horizontally 2–4 cm. beyond the fronds of the season; basal secondary segments (pinnules) with a definite margined petiolule; indusium as in var. *Mackayii* . . . . . var. *protrusa.*

Cystopteris fragilis (L.) Bernh. Schrader's Journal i, pt. 2, 26, t. 2, fig. 9 (1806). *Polypodium fragile* L. Sp. Pl. ii. 1091 (1753).[2]—Eurasia; in America across the North from Greenland to Alaska, south commonly to northern New England, the region of the Great Lakes (and perhaps sporadically farther in the East), Missouri, western Texas and southern California. The widely distributed collection, *Fernald, Wiegand, Bartram & Darlington* 4314, from Grand Falls, Newfoundland, July 10, 1911, may stand as representative of the American plant.

Linnaeus had no specimen of *Polypodium fragile* in his herbarium in 1753. The species rests on several unillustrated references to literature, including Linnaeus's own Flora Suecica and Flora Lapponica, and one to Plukenet's Almagestum, pl. 180, fig. 4. This represents, accurately enough, the commonest leaf-form in the species, with lance-ovate, acute pinnae and deltoid-ovate to deltoid-lanceolate sessile basal secondary segments, which are narrowed rather evenly

[1] For instance, the American specimens here referred to typical *C. fragilis* show a greater tendency to develop elongate, horizontal rootstocks than does Old World material at hand or than is indicated by European descriptions. But the American tendency is by no means uniform and appears to be associated with no other character; at present, I cannot see that it offers any clear basis for further segregation.

[2] For full European synonymy, see Luerssen in Rabenhorst, Krypt.-Fl. Deutschl. iii. 451 (1889).

from near the base to a blunt point. In the absence of a specimen, this figure should stand as the type of the species.

In eastern North America, the species shows two opposite extremes in leaf-form, to which Lawson, D. C. Eaton, Macoun & Burgess, Gilbert, Farwell and Clute have applied, probably correctly, names originally based on European material. These forms are:

Forma DENTATA (Dickson) Clute, Fern Bulletin xiv. 120 (1906). *Polypodium dentatum* Dicks. Fasc. Plant. Crypt. Brit. iii. no. 1, t. 7, fig. 1 (1793). Lamina scarcely more than pinnate-pinnatifid, secondary divisions only shallowly lobed and very obtuse, their lobes also obtuse. Distinguished from var. *Mackayii* only by its broad-based secondary segments and long indusia.

Forma ANGUSTATA (Hoffmann) Clute, l. c. *Polypodium fragile angustatum* Hoffm. in Roemer & Usteri, Mag. Bot. ix. 11, fig. 14d (1790). Lamina pinnate-bipinnatifid, secondary divisions lanceolate, both they and their lobes acute.

In Missouri and Oklahoma, *C. fragilis* passes into an ill-defined but, in its extreme, striking form, with rather broadly deltoid obtuse pinnae, often more than half as wide as long, obtuse secondary segments, the outer often linear-oblong with nearly parallel sides, and, curiously, rather uniformly large and conspicuous sori. This resembles small fronds of *C. bulbifera* and has been taken for that species. It was long ago observed and described, but not given a name, by Milde[1] who had a specimen from Missouri collected by Engelmann and, though he could see little in his material of var. *protrusa*, considered this "Formam memorabilem, fortasse speciem distinctam." It may be worth designating as:

Forma **simulans**, f. nov., pinnis deltoideis, obtusis, segmentis secundi ordinis obtusis saepe anguste oblongis, soris magnis. A specimen in the Gray Herbarium collected in woods, La Grange, Missouri, Sept. 14, 1911, *John Davis*, may serve as type.

Rarely, and rather evidently as a response to unusual conditions of growth (such as, perhaps, the burying of the plant under leaf-mold or earth), typical *C. fragilis* produces repent rootstocks as long and as sparsely beset with old leaf-bases as in var. *protrusa*. Macoun & Burgess (Trans. Roy. Soc. Can. 1884. 214) record one case, at London, Ontario (presumably, but not quite necessarily, referable to the typical form) in which the rootstock was a foot long and branched. Even so, the rootstock is not produced beyond the fronds of the season. D. C. Eaton's figure (Ferns N. Am. ii. pl. 53, fig. 1 (1879)) was evidently drawn from an aberrant plant of this sort. The ap-

[1] Fil Eur. 154 (1867).

parent clavate projection beyond the frond-base is, as close inspection of the drawing and similar material (Selkirk Mts., British Columbia, *Shaw* 1095) in the Gray Herbarium show, not really part of the root-stock, but a cluster of young fronds.

Var. LAURENTIANA Weatherby, RHODORA xxviii. 130 (1926). Originally known only from the region about the Gulf of St. Lawerence, but recently discovered at three localities in the Bruce Peninsula, Ontario—Driftwood Cove, Tobermory, Aug. 21, 1933, *T. M. C. Taylor* 6109; Stokes Bay, July 3, 1934, *Taylor* 9586; Barrow Bay, Aug. 25, 1934, *Krotkov* 9590.

Var. MACKAYII Lawson, Fern Flora of Canada, 233 (1889). *Nephrodium tenue* Michx. Fl. Bor.-Am. ii. 269 (1803). *Aspidium tenue* Sw. Syn. Fil. 58 (1806); Schkuhr, Krypt. Gewächse 196, t. 53b (at least as to left-hand figure and indusium) (1815). *Athyrium tenue* Presl Rel. Haenk. i. 39, in obs. (1825). *Cystopteris tenuis* Desv. Mém. Soc. Linn. Paris vi. 263 (1827). *C. Filix-fragilis*, var. *tenuis* Farwell, Rep. Mich. Acad. Sci. vi. 200 (1904), at least as to name-bringing synonym. Not *C. fragilis*, var. *tenuis* Milde, Fil Eur. 149 (1867).—Nova Scotia and southern Quebec to Virginia and occasionally westward to Wisconsin, Illinois, Missouri and the Black Hills of South Dakota. The prevailing form in southern New England; apparently not common elsewhere—Representative specimens are as follows. QUEBEC: Cleveland, July 20, 1923, *Chamberlain & Knowlton.* NEW BRUNSWICK: Grand Manan, Aug. 11, 1926, *Weatherby* 5600. NOVA SCOTIA: near West River, Lime Rock, Pictou Co., July 21, 1875 and northeast of Mt. Dalhousie, Pictou, Sept. 16, 1876, *Mackay;* George River, Aug. 29, 1920, *Bissell & Linder* 19471. MAINE: Cascade Brook, T. XVIII, Range 10, July 21, 1893, *Fernald* 208. NEW HAMPSHIRE: Gap Mt., Troy, May 30, 1898, *Rand & Robinson* 1028. VERMONT: Hartford, July 23, 1890, *Kennedy.* MASSACHUSETTS: Granville, June 26, 1914, *Seymour* 204. CONNECTICUT: Gaylordsville, July 14, 1887, *Holden.* NEW YORK: Thousand Island Park, Jefferson Co., July 2, 1902, *Robinson & Maxon* 76; Ithaca, June 18, 1916, *Wiegand* 5392. DELAWARE: Mt. Cuba, July 13, 1873, *Commons.* VIRGINIA: Stony Man Mt., Aug. 19, 1901, *Steele* 141. ILLINOIS: Starved Rock, La Salle Co., June 1–7, 1909, *Greenman, Lansing & Dixon* 168. SOUTH DAKOTA: Williams, Black Hills Region, Aug., 1891, *Thornber.*

A weaker variety than var. *protrusa*, depending on the association of short indusia and cuneate-based basal secondary segments and on its concentration in a geographic area lying between the regions inhabited by the typical form and that variety. In other respects also, such as the indusium and a tendency, in its larger forms to develop somewhat petiolulate segments, it forms somewhat of a transition between the typical form and var. *protrusa.*

I have not seen Lawson's type, but material furnished Davenport

by Mackay and now in the Davenport Fern Herbarium is presumably authentic. As previously noted, there is no doubt that Michaux's *Nephrodium tenue*, from southern Quebec, belongs here, though his name cannot be used in the varietal category.

Where *C. fragilis*, forma *magnasora* Clute, Fern Bulletin ix. 65 (1901) belongs, I do not know.

EXPLANATION OF PLATE 383

Fig. 1, Frond of *Cystopteris fragilis*, var. *protrusa* × ½; 1a, pinna of the same × 1, both from *Biltmore Herb.* no. 144c; 2, pinna of var. *Mackayii* × 1, from a specimen collected at Hartford, Vermont, by *Kennedy;* 3, pinna of *f. simulans* × 1, from the type specimen; 4, pinna of typical *C. fragilis*, × 1, from a specimen collected by Collins & Fernald at Rivière du Loup, Quebec; 5, indusium of vars. *Mackayii* and *protrusa*, approximately × 20; 6, indusium of typical *C. fragilis*, approximately × 15. Both indusia after Schkuhr.

GRAY HERBARIUM.

CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY—NO. CIX.

MIDSUMMER VASCULAR PLANTS OF SOUTHEASTERN VIRGINIA

M. L. FERNALD

(Plates 384–405)

STIMULATED by the success of the brief botanical trip to Princess Anne and Norfolk Counties, Virginia, made by Mr. Griscom and me in September, 1933, and reported upon in the paper, *Three Days of Botanizing in Southeastern Virginia*,[1] I induced Mr. Bayard Long to join me for a midsummer trip to the same area in 1934. Mr. Griscom being then in Europe it was necessary to forego his always cheerful and stimulating companionship. Accompanied by my son, Mr. Henry G. Fernald, as chauffeur and photographer, Mr. Long and I reached Virginia Beach on July 27. We had expected to stay four or five days but the pressure of interesting plants and those new to the area forced us to prolong the stay until August 9; and even then, on our last half-day in the field we brought in more than a score of species not previously reported from Princess Anne County. When we left, therefore, we were fully aware of the vast amount of exploration still needed and the desirability of further studies in the region.

[1] Fernald & Griscom, RHODORA, xxxvii. 129–157, 167–189, plates 332–351. Contrib. Gray Herb. no. cvii (1935).

The hot midsummer days, with temperatures daily reaching or exceeding 37.7° C (100° F) and an atmospheric humidity near 80, are the feast-times of chiggers (red-bugs) and ticks. Consequently, the call for a minimum of clothing, coupled with the necessity for perfect protection against invaders, strongly convinced us that, climatically at least, the region was one in which the austro-riparian flora should luxuriate. Kearney, in his very detailed study of the area, *Report on a Botanical Survey of the Dismal Swamp Region*,[1] has already so satisfactorily described the country, its climate and vegetation that it is necessary here merely to refer to that preliminary publication. Covering a vastly greater area than we and concentrating on the Dismal Swamp, which we barely reached in our westernmost collecting, Kearney had a broad outlook upon the whole flora but, naturally, he could not detect local spots of great interest but limited extent which we were able to find. Other such spots are doubtless numerous but as yet undetected by the botanist; and, surely, many areas once of great botanical interest are now hopelessly lost to the botanist through the deep ditching which has generally prevailed. Thus, the extensive area of the Green Sea, thence across the formerly wet stretch of almost uninhabited country between Grassfield and Cornland, the area at the northeast edge of the Dismal Swamp, bounded by Wallaceton, Northwest, Great Bridge and the Herring Canal, must originally have been a region of boggy pinebarren; but today, wherever not under cultivation, it is a hopelessly uninteresting cane- or reed-brake. By sheer good luck we got into one limited spot in this area which had not yet quite dried out. Here the Savannah or Pond Pine, *Pinus serotina* Michx., a species not seen by Kearney, still persists in spite of the draining; and in this remnant of a once extensive area of wet barrens we found the last lingering relics of the original flora: *Panicum lucidum* Ashe, *Cyperus retrorsus* Chapm., var. *Deeringianus* (Britton & Small) Fern. & Griscom, *Rynchospora microcephala* Britton, *R. gracilenta* Gray, *Carex venusta* Dew., var. *minor* Boeckl. and *Ludwigia pilosa* Walt. and *L. linearis* Walt., all but the last species not seen by Kearney. Many species of wet or dry pinebarrens, unsupported by modern (or? any) authenticating specimens, have been included in our northern Manuals as occurring in southern Virginia (*Mayaca Aubleti* Michx., *Syngonanthus flavidulus* (Michx.) Ruhl., *Bartonia verna* (Michx.) Muhl., etc.). It is quite clear that the proper habitats for such plants have been largely exterminated through draining and subsequent cultivation of the land.

[1] Thomas H. Kearney, Contrib. U. S. Nat. Herb. v. no. 6, pp. 321–585 (1901).

Another factor which is rapidly destroying the remnants of native vegetation which still linger in southeastern Virginia is the universal custom of turning rich woodlands into pig-pastures or dumps. So long as Man feels as he generally does, that the earth and its natural products were God-given to Man for his personal exploitation and destruction it is perhaps hopeless to expect any of Nature's wonderful gifts to be preserved for later generations. But it is not man and pig alone who are making the havoc. The ubiquitous and unrestrained Japanese Honeysuckle, *Lonicera japonica,* is doing its utmost to strangle everything which originally grew in the borders of wooded swamps or thickets. Even the strongly armored species of *Smilax* become hopelessly entangled by it and more delicate shrubs and herbs are soon obliterated. If the "CCC" survives, nothing more beneficial to future generations in our Southeast could be devised than a vigorous warfare against the Japanese Honeysuckle, the ruthless and exterminating "yellow peril" of the South.

Other limited areas with highly specialized floras were found. As distinctive as any is a small patch of peaty, sandy and slightly boggy swale between the backs of the coastal dunes and the fresh-water ponds south of the Rifle Range, below Rudy Inlet (between Virginia Beach and Dam Neck). Search from Cape Henry to the North Carolina border, below False Cape, has failed to reveal another spot like it, with its concentration of local plants of damp sands and peats, the following of them not reported by Kearney from this region of Virginia: *Axonopus furcatus* (Flügge) Hitchc., *Panicum ensifolium* Baldw., *Gymnopogon brevifolius* Trin., *Rynchospora rariflora* (Michx.) Ell., *R. cymosa,* var. *globularis* Chapm., *R. Wrightiana* Boeckl., *Juncus Elliottii* Chapm., a remarkable new *Hypoxis,* not closely related to other American species, *Sabatia gracilis* (Michx.) Salisb., and *Lobelia Nuttallii* R. & S.

Farther south, in the damp depressions in the sand between Back Bay and the dunes of False Cape is another area of localized coastal plain plants, the following noteworthy as not in Kearney's report from the county: *Cyperus Haspan* L., *Dichromena colorata* (L.) Hitchc., *Eleocharis albida* Torr. and *E. Lindheimeri* (Clarke) Svenson (extension east from Texas), *Rynchospora caduca* Ell., *Juncus megacephalus* M. A. Curtis, *Ranunculus hederaceus* L., *Ludwigia brevipes* (Long) E. H. Eames, *Hydrocotyle ranunculoides* L. f. and, extended south from the head of Chesapeake Bay, *Limosella subulata* Ives.

The rich woodlands, as already noted by Mr. Griscom and me,

Photo. E. C. Ogden.

ASPLENIUM PLATYNEURON: FIG. 3, pinnae, × 1.
A. PLATYNEURON, var. EUROAUSTRINUM: FIG. 1, plant, × ⅔; FIG. 2, pinna, ×1.

Photo. E. C. Ogden.

SAGITTARIA WEATHERBIANA: FIG. 1, flowering plant and separate inflorescence, × $^1_2$ (TYPE); FIG. 2, dilated filaments and anthers, × 10, from TYPE; FIGS. 3–6, mature achenes, × 10.

contain many species of the interior most unexpected on the outer edge of the coastal plain, close to the Atlantic. Several such species are enumerated by Kearney. Our browsings brought to light many other plants of rich woods, several of them amazingly remote from their inland centers: *Thelypteris hexagonoptera* (Michx.) Weath., *Panicum Boscii* Poir., *Liparis liliifolia* (L.) Richard, *Goodyera pubescens* (Willd.) R. Br., *Aristolochia Serpentaria* L., *Arenaria lanuginosa* (Michx.) Rohrb., *Aquilegia canadensis* L., *Asimina triloba* (L.) Dunal, *Agrimonia parviflora* Ait. and *A. mollis* (T. & G.) Britton, *Angelica villosa* (Walt.) BSP., *Sabatia brachiata* Ell., *Galium uniflorum* Michx., *Vernonia glauca* Willd. and *Antennaria Parlinii* Fern., *A. fallax* Greene and *A. solitaria* Rydb. Isolation from the interior is well illustrated by *Vernonia glauca*, a characteristic plant, as Small expresses it, of "Wooded slopes and riverbanks, various provinces N of Coastal Plain, Ga. to Ala., Pa. and N. J." Yet in the woods near Little Creek it is less than a mile from the sea.

From these introductory notes it will be apparent that the southeastern counties of Virginia still support a flora of real interest, one which we are just beginning to know, although the activities of Man have severely diminished it. In view of the very detailed list already published by Kearney it will be useful to have on record all species collected by us which he did not record from our limited area (Princess Anne and Norfolk Counties) and which were not recorded in the paper by Griscom and me. The numbers cited are of herbarium specimens collected as vouchers. We spent one night before reaching Virginia Beach at Wachapreague in Accomac County. Although Accomac County is north of the entrance to Chesapeake Bay a few records of range-extensions there are here included. In a few cases additional stations discovered by Mr. Griscom and me in September, 1933 (and not previously reported) or in May, 1935, or by Griscom, Long and myself in June, 1935, are included; but in the main the later collections await further study before a report upon them will be justified.

The accompanying report contains numerous technical plates, the photographs, chiefly by Mr. E. C. Ogden, made possible through a grant from the Milton Fund for research of Harvard University. The expense of their reproduction has been most generously met by Mr. Bayard Long.

Enumeration of Noteworthy Species Collected[1]

Thelypteris noveboracensis (L.) Nieuwl. Frequent, often abundant, in rich woods, both counties: Little Neck, Princess Anne Co., no. 3608.

T. palustris Schott, var. pubescens (Lawson) Fern. Swamps or inundated woods, frequent in both counties: north of Blackwater River, no. 3610.

T. hexagonoptera (Michx.) Weath. Moist or swampy woods, Little Neck, no. 3609. Seen in 1935 in abundance on Great Neck and nearer Virginia Beach.

Asplenium platyneuron (L.) Oakes. Frequent in woodlands, northern half of Princess Anne Co.: rich woods east of Little Creek, no. 3602.

Asplenium platyneuron (L.) Oakes, var. **euroaustrinum**, var. nov. (tab. 384, figs. 1 et 2), frondibus fertilibus submembranaceis 2–5 dm. longis 3–7.5 cm. latis; pinnis anguste lanceolatis apice acutis vel subacutis valde serratis; soris maturis distinctis non confluentibus.—Florida to Louisiana, north to Kentucky and southeastern Virginia. Type: rich, mixed woods, Munden, Princess Anne Co., Virginia, August 1, 1934, *Fernald & Long*, no. 3603 (in Gray Herb.).

Var. *euroaustrinum* is the extreme development, gigantic for the species, in the warm region of the southeastern United States. Its most important character is in the remote sori which, when fully ripe, remain distinct, instead of becoming promptly confluent as in the wide-ranging typical *Asplenium platyneuron*. The latter is frequent to common in eastern Virginia in good soils; but var. *euroaustrinum* was seen by us only in woodlands of most austral aspect at the extreme southeastern corner of the state but it was collected by Heller in Southampton Co., about Franklin, *Heller*, no. 1147. All material in the Gray Herbarium from Florida belongs to var. *euroaustrinum*. For comparison mature pinnae from typical *A. platyneuron*, our no. 3602, from east of Little Creek, Princess Anne Co., is included in the plate as fig. 3.

I am retaining *Asplenium platyneuron* (L.) Oakes in order to avoid further changes in the nomenclature of the common species which for two generations has been passing under that name. The history and the application of the name are about as shaky as any of the Linnean definitions of American plants, based upon confused and quite inadequate knowledge. Nomenclaturally *Asplenium platyneuron* rests upon *Acrostichum platyneuron* L. Sp. Pl. ii. 1069 (1753), a treatment copied directly (with the omission of the original diagnosis) from the

[1] Unless otherwise designated the collectors are *Fernald & Long;* the collections of *Fernald & Griscom* are cited as of *F. & G.;* those of *Fernald, Griscom & Long* as of *F. G. & L.*

dissertation on *Acrostichum* of Linnaeus's pupil, Johann Benjamin Heiligtag, and published in L. Amoen. Acad. i. 156 (1749).

The treatment in Heiligtag's dissertation was as follows:

10. *ACROSTICHUM frondibus pinnatis, pinnis alternis ovatis crenatis sessilibus sursum arcuatis. Gron. virg.* 123.

Filix Polypodium dicta minima virginiana platyneuros. Pluk. alm. 153. *t.* 289. *f.* 2. *Raj. app.* 58.

Asplenium virginianum, polypodii facie. Raj. app. 59.

Polypodium minus virginianum, foliis brevibus subtus argenteis. Moris. hist. 3. *p.* 563. *s.* 14. *t.* 2. *f.* 6.

Habitat in *Virginia.*

Facies Polypodii officinarum.

Stipites nudi, alterni, palmares.

Frons pinnata lobis alternis, obtusis, integerrimis, obverse ovatis, aut oblongis, sursum arcuatis, basi coadunatis; aversa foliorum pars alba pulvere ferrugineo adspersa.

Morisoni datum synonymon huc spectat, licet ipse hoc idem conjungat cum specie octava.

The account in Species Plantarum was essentially identical but ended with "*Habitat in* Virginia."

Taking up the citations as they are given in Species Plantarum, the first, *Acrostichum frondibus alternatim pinnatis, foliolis ovatis crenatis sessilibus, sursum arcuatis* of Gronovius, was based primarily upon Clayton's no. 14 (*Trichomanes foliis minoribus, caule nigro splendente*). The Clayton specimen, studied by Asa Gray in 1839, was recorded by him on the margin of the copy of Gronovius used by him for that purpose as *Asplenium ebeneum* Ait. That identification, the only satisfactory evidence that *Acrostichum platyneuron* was an *Asplenium,* was promptly taken as typifying the species; and, since this typification was accepted without question by Moore, Hooker, D. C. Eaton and others, it is better to let it so stand.

The other bases of *Acrostichum platyneuron* are wholly a sad mixture of *Polypodium virginianum* L. and *P. polypodioides* (L.) Watt. *Filix Polypodium dicta minima Virginiana platyneuros* of Plukenet, from which the specific name *platyneuron* was, obviously, taken, rests on a conventionalized figure of a *Polypodium virginianum.* This figure shows a rachis somewhat exaggerated by shadow, which could well be described "platyneuros." Ray took over the Plukenet species and added to the citation "*vide* Asplenium Virginianum Polypodii facie *D. Pet.*" This plant, the 2nd listed by Linnaeus as identical with that of Clayton (or Gronovius), was well described by Ray as a hand's breadth high, with the pinnae as in *Polypodium,* the fruit as in *Asplenium* (possibly meaning something quite outside our present

Asplenium), the fruiting side of the frond whitish and roughened with ferruginous dots (Seminalia autem exanthemata ferruginei coloris non sunt sed albicantes punctulis ferrugineis aspera). The latter character could have been drawn only from *Polypodium polypodioides;* yet Ray went on to state that his species is Plukenet's *Filix Polypodium dicta minima Virginiana platyneuros,* already shown to be the smooth *P. virginianum.* Morison's *Polypodium minus virginianum, foliis brevibus subtus argenteis* was likewise undoubted *P. polypodiodes;* the figure is unequivocal and the description is perfect.

Returning to the original (or compiled) diagnosis in the dissertation on *Acrostichum,* it is clear that Linnaeus and his student, Heiligtag, were confused: "*Facies* Polypodii officinarum" was certainly a sufficient indication of *Polypodium;* "*Stipites* nudi, alterni, palmares" actually describes the stipes of *Polypodium virginianum,* not the very short and tufted stipes of the *Asplenium;* "lobis . . . integerrimis, obverse ovatis . . . sursum arcuatis" is perfectly good for *Polypodium,* not for the *Asplenium;* and surely "aversa foliorum pars alba pulvere ferrugineo adspersa," the phrase taken right out of Ray, could apply to nothing but *Polypodium polypodioides.*

If we typify *Acrostichum platyneuron* by most of the literary references and by the clear but compiled diagnosis in Amoen. Acad. we can arrive only at a mixture of *Polypodium virginianum* and *P. polypodioides,* both bearing Linnean specific epithets dating from 1753. Only by ignoring all the confused and quite misunderstood references to *Polypodium* and putting the weight on the plant of Clayton which Gronovius described, which Linnaeus studied (but misunderstood) and which Gray, Moore, Hooker and others selected as the true basis of *Acrostichum platyneuron,* can we save the name in its current application. In view of the consensus of good usage it is wisest to let it so stand; but the case is a perfect one to place before those philosophical but usually botanically inexperienced enthusiasts who think that typification or elucidation of the muddled concepts of early authors can be properly accomplished by means of a single RULE. A rule which in one case would conserve an established usage in another would do the opposite, unless we can agree that in these old and obscure medleys typification was accomplished by the student who first selected one element to stand as typical. Such a rule as that would conserve most names. A rule which arbitrarily designates the first citation or the first plate or the diagnosis would often do havoc to usage. The diagnosis of *Acrostichum platyneuron,* for example, applies not to *Asplenium* but to two species of *Polypodium.*

Athyrium asplenioides (Michx.) Desv. Common in moist woods and swamps, highly variable in size, attenuation of pinnae and color (green or rufescent): Little Neck, nos. 3604, 3605; Oceana, no. 3606.

Botrychium virginianum (L.) Sw. Rich woods, occasional in both counties: Little Neck, no. 3612; east of Little Creek, *F. & G.*, no. 4291; near Benefit, *F. & G.*, no. 4292.

All the material has more oblong and blunter pinnules than the plant of the Northeast and of the Alleghenian region. It is presumably typical *B. virginianum*, the type of which is now being compared with it in London.

B. dissectum Spreng. Dry, mixed woods, Little Neck, no. 3613.

B. dissectum, forma obliquum (Muhl.) Fern. With the latter, no. 3614.

Lycopodium inundatum L., var. Bigelovii Tuckerm. Damp or wet peaty or sandy depressions near the coast: The Desert, Cape Henry, no. 3615; Rifle Range, south of Rudy Inlet, no. 3616.

Pinus serotina Michx. Common in wet peaty soil of southern Norfolk Co., from the northeast corner of the Dismal Swamp eastward across the Green Sea: south of Grassfield, no. 3618.

Typha angustifolia L., var. elongata (Dudley) Wiegand (var. *virginica* Tidestrom.). Marshes and margins of ponds and creeks, Princess Anne Co.: margin of Owl Creek, Virginia Beach, no. 3621.

One of Tidestrom's original collections of his var. *virginica* was from Cape Henry.

Typha truxillensis HBK. Nov. Gen. et Sp. i. 68 (1815). *T. latifolia* **domingensis* Pers. Syn. ii. 532 (1807). *T. domingensis* (Pers.) Kunth, Enum. iii. 92 (1841). Virginia: border of salt marsh by Back Bay, Munden, no. 3623; border of Nowney Creek, Back Bay, *F. G. & L.*, no. 4530. North Carolina: brackish marsh of Back Bay, east of Morse Point, Currituck Co., no. 3622, *F. G. & L.*, no. 4529.

Typha truxillensis is very conspicuous on the brackish marsh, near the causeway leading from south of Munden to Knott's Island, North Carolina and Virginia. It there grows in intimate association with *T. angustifolia* L., and the contrast between the two could hardly be better demonstrated: *T. angustifolia* comparatively low, with few dark-green, subherbaceous, plano-convex leaves and deep reddish-brown spikes; *T. truxillensis* twice as tall, the 10± very pale and coriaceous flat leaves overtopped by the whitish-brown spikes, so very tall as to give special point to two of the names under which it has passed: *T. gigantea* Schur (1865) and *T. maxima* Schur (1905). After collecting and photographing *T. truxillensis* within the limits of North Carolina we made a point of visiting the marshes of Back Bay slightly to the north, within Virginia, where it is equally abundant.

In mid-June, 1935, it was barely in anthesis, whereas *T. latifolia* and *T. angustifolia* were in young fruit (with staminate flowers shriveled).

Typha truxillensis (as *T. domingensis*) is recorded by Graebner in Engler's Pflanzenr. iv[8]. 14 (1900) from temperate[1] and tropical South America, Central America and the West Indies, northward to southern California, Texas and Louisiana. It is in the Gray Her-

[1] In view of the abundance of *Typha truxillensis* (*T. domingensis*) in temperate South America, it is difficult to understand the statement of Mr. J. Hutchinson (Fam. Fl. Pl. ii. Monoc. 128 (1934)): "Typha; absent from America and Africa south of the equator." There are many specimens of *T. truxillensis* (often misidentified as *T. angustifolia* and even as *T. latifolia*) in the Gray Herbarium from southern Brazil, Uruguay and Argentina, from between lat. 30° and 35° S. In his *Contributions to the Flora of North Patagonia*, Journ. Linn. Soc. xxi. 236 (1884), John Ball wrote of it (as *T. angustifolia*): "Extends from the valleys of North Patagonia through the provinces of Buenos Ayres and Entrerios." A sheet of this material in the Gray Herbarium is typical *T. truxillensis*. But Ball's conclusion regarding the dispersal of "This cosmopolitan species" should be modified, since *T. truxillensis* is purely American. In 1894, Kronfeld in Martius, Fl. Bras. iii[3]. 642, gave the range of *T. domingensis:* "Habitat in Americae regionibus inter 35. circulum parall. longitudinis septentrionalis et Patagoniam sitis inclusa India occidentalis"; and he cited many specimens from south of the equator. Graebner in Pflanzenr. iv[8] gives *T. domingensis* a similar range: "südlich bis nach Buenos-Aires und Nordpatagonien." Our collections extend the range to lat. 36° 40′ N.

As to the absence of *Typha* from "Africa south of the equator," reference merely to *Index Kewensis*, Kronfeld's monographic study in 1889 and Graebner's treatment in Das Pflanzenreich would have been sufficient to show that *T. capensis* came from South Africa, that *T. latifolia*, proles *Hildebrandtii* occurs only on Madagascar and that *T. angustifolia*, subsp. *australis* grows in Zanzibar, the Transvaal and at the Cape of Good Hope!

Unfortunately others of Hutchinson's statements of the geographic areas occupied by groups have to be carefully checked or treated with easy-going liberality: for instance, his brief summaries under *Lophotocarpus* (p. 34), the *Xyridaceae* (pp. 61 and 63) and *Hemerocallis* (p. 91). The broad range of the *Xyridaceae* (the genus *Xyris*) is given: "Warmer regions of the world, usually in saline marshes; numerous species in Florida." I have personally known *Xyris* in the field for nearly half-a-century, but I never saw it in *saline* soil. Small, including the "numerous species [about 20] in Florida," rightly assigns them all fresh habitats, 15 of the species in "pinelands," which are not saline. Of the 28 species in *Flora Brasiliensis* only 1 is assigned a possibly maritime habitat (with no statement that it is saline). "Trop. and Subtropics," given as the range of *Xyris*, surely needs some qualification as a statement of the occurrence of a genus ranging from 42° S. lat. to 50° N. lat. Similarly "Tropics generally" for *Lophotocarpus*, which grows northward to northeastern New Brunswick (47° N., the latitude of the Loire, central Switzerland or the Tirol) and to Oregon, is not fully satisfactory; and "Hemerocallis (Calif.)" for a well-known Eurasian genus, which is found in California only in gardens, is inexplicable unless one supposes it to have arisen through confusion with the western American *Hesperocallis*, but in the same paragraph Hutchinson correctly assigns *Hesperocallis* to California. Every one may make occasional slips but, when such misstatements are numerous and put forward with seeming finality, they increase the reader's scepticism regarding the deductions drawn and the fundamental changes of classification proposed. The natural caution about following Hutchinson in removing *Allium* and its allies from the *Liliaceae* and transferring them to the *Amaryllidaceae* or in severing the *Resedaceae* from the *Papaverales* and placing them in the *Violales* seems justified. In some cases, however, Hutchinson puts a single genus into two groups: thus *Kyllinga* (p. 196) is placed in the tribe *Rynchosporeae* and also in the tribe *Cypereae*. If that is possible, why should not a genus belong to two families and a family to two orders?

barium also from Lee Co., Florida (*J. P. Standley*, no. 141). Its abundance about Back Bay indicates that in the Carolinas and Georgia it has presumably been confused with *T. angustifolia*.

Sagittaria falcata Pursh. Salt to brackish or fresh marshes and river-margins, seen at Munden and on the marshes of North Landing River and its tributary, Blackwater River: Munden, no. 3625.

This is doubtless the plant listed by Kearney as *S. lancifolia* L. *S. falcata* was long confused with the latter species of tropical and subtropical America; it has the bracts of the inflorescence short, blunt and coarsely papillate, whereas the bracts of *S. lancifolia* (known in Florida) are lance-attenuate, much-prolonged and smooth.

Sagittaria **Weatherbiana**, sp. nov. (tab. 385 et tab. 386, fig. 1), planta 4–9 dm. alta; rhizomate breve et crasso, stolonibus elongatis apice tuberosis; foliis exterioribus membranaceis lineari-oblongis obtusis vel subacutis 1.5–2.5 cm. latis; foliis interioribus longe petiolatis, petiolo erecto 2–4.5 dm. longo crasso, basi dilatato-amplectante; limbo lanceolato vel oblanceolato vel elliptico utrinque acuminato 1.2–2.5 dm. longo 2.5–7.5 cm. lato submembranaceo perviridi 5–7-nervo; scapo erecto 3–6 dm. alto; inflorescentiis monoicis vel dioecis verticellis 3–6 remotis, flores longe et graciliter pedicellatis, pedicellis 2.5–6.5 cm. longis ante anthesin adscendentibus postea divaricatis; bracteis 3 scariosis ovato-acuminatis basi coalitis 5–10 mm. longis; sepalis ovatis 6–9 mm. longis, post anthesin reflexis; petalis obovatis lacteis 1–1.5 cm. longis; staminibus 12–18, filamentis complanatis basi dilatatis pubescentibus, antheris lineari-oblongis fere basifixis 2–2.5 mm. longis; carpellis maturis complanatis anguste et oblique cuneato-obovatis 2–2.5 mm. longis 1–1.5 mm. latis utrinque anguste alatis, alis tenuibus, parietibus costis 1–3 elongatis instructis vel ecostatis, stylo subulato vix 0.5 mm. longo.—Southeastern Virginia to eastern South Carolina. Virginia: in water of gum swamp south of North Landing, Norfolk Co., August 7, 1934, *Fernald & Long*, no. 3624, disintegrating material, distributed as *S. cycloptera* (J. G. Smith) Mohr; open pools in gum swamp north of Land of Promise (same region as above), May 7, 1935, in flower, *Fernald & Griscom*, no. 4297, type in Gray Herb.); same station, June 18, 1935, in overripe fruit, *Fernald, Griscom & Long*, no. 4536. North Carolina: shallow water of roadside excavation, Washington, Beaufort Co., April 15, 1932, in flower, *Weatherby*, no. 6086, distributed as *S. lancifolia* L. South Carolina: marsh, Longwood Island, Waccamaw River, Horry Co., April 22, 1932, in flower, *Weatherby & Griscom*, no. 16,395, distributed as *S. lancifolia* L.

Sagittaria Weatherbiana has been confused, it will be noted, with both *S. cycloptera* and *S. lancifolia;* it is also somewhat allied to *S. graminea* Michx. and it superficially resembles *S. ambigua* J. G. Sm. From *S. graminea* with which, as well as with *S. cycloptera*, it shares

dilated filaments, it differs in its greater size in all parts, *S. graminea* having narrower and long-acuminate phyllodia; slender-petioled inner or later leaves, with blades very rarely up to 1.5 dm. long and 3 cm. broad; pedicels at most 3 cm. long; bracts blunt and at most 6 mm. long; anthers (PLATE 386, FIG. 2) ellipsoid or rounded and only 0.6–1 mm. long; achenes (PLATE 386, FIGS. 3–5) 1.5–2 mm. long. *S. graminea* flowers in the North (Newfoundland, southern Labrador and Ontario thence into the northernmost States) from late June to September, in the southern part of its range (Delaware, District of Columbia, southern Indiana, Missouri and Texas) from late May to August; *S. Weatherbiana* is one of the earliest species, flowering in April and early May, its mature achenes essentially all dropped by mid-June.

S. Weatherbiana in foliage closely simulates *S. ambigua*. That species of Missouri, Kansas and Oklahoma, however, has lance-attenuate, very slender-tipped and papillate bracts 1–1.5 cm. long and essentially free to the base; pedicels only 1.5–3.5 cm. long; filaments (PLATE 386, FIG. 6) filiform-subulate (not dilated below); and shorter and much more rounded achenes (PLATE 386, FIG. 7). *S. Weatherbiana* only superficially resembles *S. ambigua*.

The newly proposed species, when Mr. Long and I first collected it, was placed provisionally in *S. cycloptera*, awaiting adequate flowering and fruiting material. The differentiating characters are many: *S. cycloptera* has an elongate rhizome; narrow (3–12 mm. wide) and long-attenuate phyllodia; slender-petioled later leaves, with linear-lanceolate blades; pedicels 1–3 cm. long; anthers (PLATE 386, FIG. 8) 0.8–1.2 mm. long; and achenes (PLATE 386, FIGS. 9 and 10) with very conspicuously developed dorsal keel.

From *Sagittaria lancifolia* the more northern *S. Weatherbiana* differs in many characters. *S. lancifolia*, a tropical American species, unknown north of Florida, has coriaceous blades, firm lanceolate bracts up to 3 cm. long; pistillate pedicels shorter than to about twice as long as their subtending bracts; filaments (PLATE 386, FIG. 11) slender (not dilated); achenes (PLATE 386, FIGS. 12 and 13) 2.5–3 mm. long, with thickened dorsal keel; a species far removed from *S. Weatherbiana*.

The northeastern representative of *Sagittaria lancifolia* is *S. falcata* Pursh, extending north to Delaware and Maryland. Like *S. lancifolia* it has firm or coriaceous pale-green leaves, quite different from the dark-green and submembranaceous blades of *S. Weatherbiana*.

Photo. E. C. Ogden.

Sagittaria Weatherbiana: fig. 1, phyllodia, × 5/12.
S. graminea: fig. 2, anthers, × 10; figs. 3–5, achenes, × 10.
S. ambigua: fig. 6, stamens, × 10; fig. 7, achene, × 10.
S. cycloptera: fig. 8, stamens, × 10; figs. 9 and 10, achenes, × 10.
S. lancifolia: fig. 11, stamens, × 10; figs. 12 and 13, achenes, × 10.
S. falcata: fig. 14, stamens, × 10; fig. 15, achene, × 10.

Photo. E. C. Ogden.

ELEOCHARIS AMBIGENS: FIG. 1, plant, × 2/5; FIGS. 2 and 3, spikelets, × 4; FIGS. 4 and 5, summit of sheath, × 10; FIG. 6, achene, × 10; FIG. 7, achene, × 25; FIG. 8, surface of achene, × 50.

E. UNIGLUMIS: FIG. 9, spikelet, × 4; FIG. 10, summit of sheath, × 10; FIG. 11, achene, × 10.

E. HALOPHILA: FIG. 12, spikelet, × 4; FIG. 13, summit of sheath, × 10; FIG. 14, achene, × 10.

Its bracts and sepals are obtuse and strongly papillose; its pistillate pedicels are only 0.5–2.5 cm. long; its filaments (PLATE 386, FIG. 14) are slender and longer than the anthers; and its falcate achenes (PLATE 386, FIG. 15) are only 0.7–1 mm. wide and tapering to erect beaks. *S. falcata* is a late-flowering species of brackish to fresh river- and pond-borders and marshes. In southeastern Virginia, the Carolinas and Georgia it flowers from July to September. In Princess Anne County, the day (June 18) we collected the deep-green *S. Weatherbiana* with its achenes mostly fallen, the pale-leaved *S. falcata*, at the margins of Blackwater and North Landing Rivers, had not developed sufficiently to show young flower-buds.

PUCCINELLIA FASCICULATA (Torr.) Bickn. Upper border of salt marsh, Wachapreague, Accomac Co., no. 3629.

Apparently an extension southward from Delaware.

GLYCERIA SEPTENTRIONALIS Hitchc. Shallow water of swampy woods throughout, flowering in May (or earlier), essentially unrecognizable in mid-June: south of North Landing, no. 3630 and *F. & G.*, no. 4308; Little Creek, *F. & G.*, no. 4307; near Cornland, *F. & G.*, no. 4309.

The profusion of *Glyceria septentrionalis* in the coastal-plain swamps of southeasternmost Virginia and its absence northeast of Massachusetts, suggests that is is a subaustral, rather than a boreal species.

TRIPLASIS PURPUREA (Walt.) Chapm. Sand dunes, Cape Henry, *F. & G.*, no. 2712.

CALAMAGROSTIS CINNOIDES (Muhl.) Bart. Frequent from the northeastern corner of the Dismal Swamp across the Green Sea: wet peaty clearings in woods of *Pinus serotina*, south of Grassfield, no. 3647.

POLYPOGON MONSPELIENSIS (L.) Desf. Fresh to brackish or saline swales, pond-margins and shores, with strictly indigenous associates and looking as native as they: Wachapreague, no. 3643; outlet of Rainey's Pond, Sand Bridge, no. 3644, *F. G. & L.*, no. 4550; Cedar Island, *F. G. & L.*, no. 4551.

The statements of habitat, "Waste places" and "Moist waste places," in our current manuals are most unsatisfactory for the plant of the Virginia coast, although on the coast northward to New England the plant has every appearance of a casual introduction.

SPOROBOLUS POIRETII R. & S. Roadsides, borders of fields and ditches, frequent: Little Creek, no. 3645; Knott's Island, no. 3646.

ARISTIDA OLIGANTHA Michx. Dry clay of open woods and thickets, north of Blackwater River, no. 3641.

A. LONGESPICA Poir. Dry open soil or open woods: north of Blackwater River, no. 3642; Cedar Hill, *F. & G.*, no. 2718.

Leptochloa filiformis (Lam.) Beauv. Border of brackish marsh near Kempsville, *F. & G.*, no. 2709.

Spartina cynosuroides (L.) Roth. Salt or brackish marshes, frequent: Kempsville, *F. & G.*, no. 2710.

Gymnopogon brevifolius Trin. Occasional in Princess Anne Co.: border of ditch, Macon's Corner, *F. & G.*, no. 2708; damp sandy and peaty depressions back of dunes, Rifle Range, south of Rudy Inlet, no. 3650.

Axonopus furcatus (Flügge) Hitchc. Princess Anne Co.: damp sandy and peaty depressions back of the dunes, Rifle Range, south of Rudy Inlet, no. 3663; dry open clay lands and thickets, Virginia Beach, no. 3664.

Paspalum laeve Michx., var. pilosum Scribn. (*P. longipilum* Nash). Pine woods near Macon's Corner, Princess Anne Co., *F. & G.*, no. 2730.

P. laeve, var. circulare (Nash) W. Stone (*P. circulare* Nash). Ditch by brackish marsh of North Landing River, Pungo Ferry, *F. & G.*, no. 2728.

P. setaceum Michx. Dry thicket near Cedar Hill, *F. & G.*, no. 2729.

P. setaceum Michx., var. supinum (Bosc) Trin. (*P. supinum* Bosc). Wet peaty depressions in sandy pineland, The Desert, Cape Henry, no. 3659; sandy woods, northern end of Knott's Island, Princess Anne Co., no. 3660.

A slight extension northward, from North Carolina. *Paspalum supinum* Bosc, like *P. longepedunculatum* LeConte, is surely too confluent with *P. setaceum* for specific recognition. By treating them as definite species taxonomic values are debased and the clarity of true species, of which there is an abundance, is obscured. *P. longepedunculatum* should stand, it seems to me, as *P. setaceum*, var. *longepedunculatum* (LeConte) Wood.

P. ciliatifolium Michx. Wet, peaty clearings in woods of *Pinus serotina*, south of Grassfield, no. 3658.

Panicum anceps Michx., var. rhizomatum (Hitchc. & Chase) Fern. (*P. rhizomatum* Hitchc. & Chase). Dry pinelands, Cape Henry, *F. & G.*, no. 2741.

P. agrostoides Spreng., var. condensum (Nash) Fern. (*P. condensum* Nash). Border of brackish marsh of North Landing River, Pungo Ferry, *F. & G.*, no. 2738.

P. aciculare Desv. Damp sands and peats or sandy woods, Princess Anne Co.: Cape Henry, no. 3693, *F. & G.*, no. 2748; Rifle Range, no. 3694; Sand Bridge, *F. G. & L.*, no. 4537.

P. angustifolium Ell. Dry or moist woods, common in Princess Anne Co.: Little Neck, no. 3695; Virginia Beach, no. 3697.

P. roanokense Ashe. Swales and damp sands, Rifle Range, south of Rudy Inlet, nos. 3667, 3668, 3675; boggy swale by Northwest River, Northwest, *F. G. & L.*, no. 4538.

P. LUCIDUM Ashe. Wet peaty clearings in woods of *Pinus serotina*, south of Grassfield, nos. 3670–3672; swampy or inundated woods, north of Blackwater River, no. 3673.

P. LANUGINOSUM Ell. Frequent in swampy woods and wet peat: north of Blackwater River, no. 3680; Princess Anne Courthouse, *F. & G.*, no. 2755.

P. LANUGINOSUM, var. SEPTENTRIONALE Fern. Swales back of the dunes, Rifle Range, south of Rudy Inlet, no. 3681.

P. VILLOSISSIMUM Nash. Occasional in Princess Anne Co.: damp sandy and peaty depressions back of the dunes, Rifle Range, no. 2699, *F. G. & L.*, no. 4543; dry mixed woods, Little Neck, no. 3700.

P. COMMONSIANUM Ashe, var. ADDISONII (Nash) W. Stone (*P. Addisonii* Nash). Damp sandy peats back of the dunes, Rifle Range, no. 3698; dry pine woods, Macon's Corner, Princess Anne Co., *F. & G.*, no. 2757.

P. COLUMBIANUM Scribn. Sandy borders of gum swamps in The Desert, Cape Henry, no. 3701.

P. SPHAEROCARPON Ell., var. INFLATUM (Scribn. & Sm.) Hitchc. Depressions in clay fields, Rosemont, no. 3676.

P. POLYANTHES Schultes. Frequent in peaty and sandy woods, thickets and clearings, both counties: south of Grassfield, no. 3677.

P. ENSIFOLIUM Baldw. Damp sandy and peaty depressions back of the dunes, Rifle Range, south of Rudy Inlet, nos. 3682, 3683, *F. G. & L.*, no. 4539.

P. BOSCII Poir., var. MOLLE (Vasey) Hitchc. & Chase. Dry, mixed woods, Little Neck, no. 3689.

TRIPSACUM DACTYLOIDES L. Frequent and conspicuous in dry fields and on roadsides, Princess Anne Co.: Munden, no. 3666.

CYPERUS RIVULARIS Kunth. Brackish marsh of North Landing River, Pungo Ferry, *F. & G.*, no. 2796.

C. SABULOSUS Mart. & Schrad. Frequent in damp soils, Princess Anne Co.: Kempsville, *F. & G.*, no. 2782; Rosemont, no. 3712; outlet of Rainey's Pond, no. 3713; Knott's Island, no. 3711.

C. COMPRESSUS L. Occasional: sandy roadside, North Landing, *F. & G.*, no. 2794; depressions in clay field, Rosemont, no. 3708; sandy woods, Knott's Island, no. 3707.

C. DIFFORMIS L. VIRGINIA: in clay of marsh bordering Owl Creek, Virginia Beach, no. 3710.

Cyperus difformis is a species of wide dispersal in the Old World tropics of Asia, Africa, Australia and the Pacific Islands. In America it seems not to have been noted except in Mexico, where it is local, and in California, where it has recently appeared in rice-fields. It abounds in the clay ditches south of the small brackish pond of Owl Creek, growing in company with the typical plants of such a habitat, where it might be indigenous or with equal probability a recent introduction. It may be another of the recent introductions into our

flora from the warm Far East, like *Cyperus Iria*, *C. amuricus* Max.[1] and *Polygonum caespitosum* Blume, var. *longisetum* (De Bruyn) A. N. Steward.[2] It is most probable that these oriental weeds have come in in rice-straw used as packing.

C. Haspan L. Local: inundated swales back of the dunes, south of False Cape, no. 3733.

C. Halei Torr. Silts near outlet of Rainey's Pond, Sand Bridge, no. 3719.

First north of Florida; leaf-margins very harsh.

C. lancastriensis Porter. Border of woods and in ditches, Little Neck, nos. 3735 and 3736.

C. retrofractus (L.) Torr. Dry pinelands, Cape Henry, no. 3734, *F. & G.*, no. 2787.

Kyllinga pumila Michx. Frequent in Princess Anne Co.: wet peaty depressions in sandy pineland, The Desert, Cape Henry, no. 3741; damp sand and clay back of the ponds, Dam Neck, no. 3742.

Eleocharis quadrangulata. In 1905 I pointed out[3] that the very distinct species with sharply quadrangular culms, *Eleocharis quadrangulata* (Michx.) R. & S., Syst. ii. 155 (1817), is quite unlike the tropical *E. mutata* (L.) R. & S., with which it had been confused. At that time I was familiar with *E. quadrangulata* chiefly at its northeasternmost station, Lake Waban at Wellesley, Massachusetts. Mr. Long and I saw *E. quadrangulata* several times in Princess Anne County and twice collected it and he, Mr. Griscom and I, in 1935, saw it in abundance and made one collection. Our material and all other from Princess Anne County and all I have seen from South Carolina, North Carolina, Delaware, and Cape May, New Jersey, agrees in being more slender and averaging smaller in all parts than the plant of the northern and inland states; but material from Savannah, Georgia is like the northern and inland plant. In the more slender plant the purple upper sheath at the base of the culm is tubular to within 10 to 5 mm. of the tip and it tardily ruptures. In the coarser plant the free tip is usually 4–6 cm. long, sometimes 8 cm., and the sheath so promptly ruptures that the free tip appears even longer.

Scirpus quadrangulatus Michx. Fl. Bor.-Am. i. 30 (1803), the type of *Eleocharis quadrangulata*, came from South Carolina and a photograph of the type most kindly sent by Professor Humbert of the Muséum National d'Histoire Naturelle at Paris and another sent by

[1] See Fern. & Grisc. Rhodora, xxxvii. 148 (1935).
[2] See Blake, Rhodora, xxxiv. 146, 147 (1932).
[3] Rhodora, xxvii. 38, t. 149, figs. 1–4 (1905).

Rev. Hugh O'Neill of the Catholic University of America show it to be the slender extreme of the southern coastal plain. I am accordingly differentiating two varieties, as follows:

Eleocharis quadrangulata (Michx.) R. & S., var. **typica.** *Scirpus quadrangulatus* Michx. Fl. Bor.-Am. i. 30 (1803). *E. quadrangulata* (Michx.) R. & S. Syst. ii. 155 (1817). Culms 3–9 dm. high, 1.5–4 mm. thick; upper basal sheath with free tip 0.5–1 cm. long; spikelet 1.5–4 cm. long; achenes 2–2.5 mm. long, 1.4–1.8 mm. broad.—Pools of coastal plain, South Carolina to Cape May, New Jersey.

Var. **crassior**, var. nov., culmis 6–12 dm. altis, 3–5.5 mm. crassis; apice libero vaginae 1.5–8 cm. longo; spiculis ad 6 cm. longis; achaeniis 2.2–3 mm. longis 1.6–2 mm. latis.—Georgia to Texas, locally north to Massachusetts, Connecticut, New York, southern Ontario, Michigan, Wisconsin, Missouri and Oklahoma. Type: in 3–8 dm. of water, Waban Lake, Wellesley, Massachusetts, October 3, 1908, *Fernald & Wiegand* in Pl. Exsicc. Gray. no. 133 (in Gray Herb.).

It is most probable that var. *crassior* is *Scirpus marginatus* Muhl., Gram. 28 (1817), which, on account of the earlier *S. marginatus* Thunb., was renamed *S. albomarginatus* R. & S. Mant. ii. 74 (1824). No material of Muhlenberg's plant can be found at Philadelphia; consequently a new type is selected for the coarse variety, for which the name assigned by Roemer & Schultes would be inappropriate.

E. rostellata Torr. Brackish marsh, Lynnhaven, no. 3760.

E. albida Torr. Local: inundated swales back of the dunes, south of False Cape, no. 3767, *F. G. & L.*, no. 4565.

E. Lindheimeri (Clarke) Svenson, Rhodora, xxxi. 199 (1929). Forming dense turf on open wet sand bordering an inundated swale back of the dunes, south of False Cape, Princess Anne Co., no. 3772, also *F. G. & L.*, no. 4572.

The first collection on the coastal plain from east of Texas and Oklahoma. Our material is quite like the type collection (*Lindheimer*, no. 315) but a little stouter. On the wet sand near False Cape (on the Back Bay side) it forms a dense green carpet, like a lawn, promptly distinguished from the taller and ubiquitous *E. flaccida* (Reichenb.) Urban by its spongy culms only up to 8 cm. high, its few-flowered flat spikelets, with narrow herbaceous and strongly striate scales, and its longitudinally ridged and trabeculate achenes.

E. microcarpa Torr. Wet peaty depressions in sandy pineland, The Desert, Cape Henry, no. 3761.

Quite typical, an extension north from South Carolina, though the only slightly different var. *filiculmis* Torr. (*E. Torreyana* Boeckl.), which is stiffer and with chestnut-brown and firmer scales, extends northward locally to eastern Connecticut. The futility of trying to

keep *E. Torreyana* apart as a species is well shown by the treatment in Small's Manual. In the key, on page 160, *E. microcarpa* is given a whole call by itself: "Scape capillary: achene-body 0.5 mm. long," while *E. Torreyana* comes under "Scape filiform: achene-body over 0.5 mm. long," with a further division indicating that the achenes are "nearly 1 mm. long." The distinction between "capillary" and "filiform" is a bit erudite for a key, and in Small's fuller description of *E. microcarpa* (p. 164) the achenes have shown some instability, becoming "0.5 mm. long or a little longer." That is what they do in Nature. After comparing many of them I have given up trying to separate as species *E. Torreyana* from *E. microcarpa*. When Torrey first called attention to the two tendencies, he did not consider them separate species and even doubted whether they were varietally separable and he did not consider that capillary and filiform culms were fundamentally different. *E. microcarpa*, based on material from New Orleans, was fully described, with capillary culms 6–8 inches long; spikelets ("spikes") nearly 2 lines long; scales with "sides brownish-red"; and "*Nut* scarcely one-third of a line [0.7 mm.] long." His β. ? *filiculmis*, from New Jersey, had "*Culms* . . . . capillary or filiform, . . . wiry, 3–4 inches high. *Spikes* more than two lines long. *Scales* dark chestnut-coloured." Torrey noted a slight difference in the shape of the achene (nut) in his specimens but it is one which quickly disappears upon examination of a large series of the two extremes. *E. Torreyana* Boeckeler was merely Torrey's unfortunately named *E. microcarpa*, var. ? *filiculmis* raised without indication of new characters to specific rank.

Eleocharis **ambigens**, sp. nov. (tab. 387, figs. 1–8), laxe stolonifera, rhizomate stolonibusque firmis purpureo-castaneis 1.5–2 mm. crassis; culmis subrigidis pallidis 2.5–6 dm. altis 0.8–1.5 mm. crassis in caespitibus parvis; vaginis artis basi purpurascentibus vel castaneis ad apicem oblique subtruncatis coriaceis; spicula lanceolata vel anguste ovoidea 4–9 mm. longa 2–3.5 mm. crassa, laxe pauciflora; squama inferiora spathiformi late ovata subcoriacea stramineo-grisea basi plerumque valde prolongata; squamis fertilis lanceolato-ovatis acutis vel subacutis pallide brunneis margine albido-hyalinis, imis mediisque 2–3 mm. longis; setis 2–3 brevissimis vel nullis; achaeniis ellipsoideo-obovoideis biconvexis stramineis deinde subcastaneis 1.2–1.7 mm. longis 1 mm. latis minute reticulatis; tuberculo depresso-deltoideo apiculato 0.2–0.5 mm. alto 0.5–0.7 mm. lato.—Pond-margins and marshes, Elizabeth Islands, Massachusetts to southeastern Virginia. Massachusetts: peaty margin of Sheep Pond, Cuttyhunk, August 11, 1927, *Fogg*, no. 2526. Rhode Island: damp sandy shore of Wash Pond, Block Island, August 22, 1913,

Fernald, Hunnewell & Long, no. 8887. New Jersey: toward the beach, Cape May Point, July 17, 1906, *S. S. Van Pelt;* Race Course Pond, Cape May Co., June 12, 1911, *O. H. Brown;* edge of salt marsh, Cape May, July 4, 1929, *Svenson*, no. 3162. Virginia: marshes bordering ponds, Dam Neck, Princess Anne Co., July 30, 1934, *Fernald & Long*, no. 3765 (type in Gray Herb.); same station, June 16, 1935, *Fernald, Griscom & Long*, no. 4567; swale bordering Muddy Creek, Princess Anne Co., June 19, 1935, *Fernald, Griscom & Long*, no. 4569; swales and pond-margin, outlet of Rainey's Pond, June 19, 1935, *Fernald, Griscom & Long*, no. 4570; swales back of the dunes, Sand Bridge, June 19, 1935, *Fernald, Griscom & Long*, no. 4571; boggy swale by Northwest River, near Northwest, June 18, 1935, *Fernald, Griscom & Long*, no. 4568.

Eleocharis ambigens has been distributed sometimes as *E. palustris* (L.) R. & S., sometimes as *E. Smallii* Britton, again as *E. uniglumis* (Link) Schultes. It is the puzzling form which influenced the late Miss Brackett and me to treat as a variety of *E. uniglumis* the plant of saline and brackish shores from the Gulf of St. Lawrence to Virginia, *E. uniglumis* var. *halophila* Fern. & Brackett, Rhodora, xxxi. 72, t. 183 (1929). All three species, *E. palustris, E. Smallii* and *E. uniglumis* (fig. 9–11) have the sheaths herbaceous at the oblique summit and the achenes smooth or only obscurely pebbled; and the first two have 2 or 3 narrow basal scales. The spathiform single basal scale of *E. ambigens* allies it with *E. uniglumis,* but that boreal species (reaching its southern limit in eastern America on the mountains of Newfoundland) has a broader tubercle (fig. 11) 0.6–1 mm. broad, its spikelets are usually twice as large and with purple to castaneous firm scales (fig. 9), and its achene is not definitely reticulated.

With *Eleocharis ambigens* now cleared from the boreal *E. uniglumis,* the troublesome series which was thought to connect the latter with its var. *halophila* disappears and the latter stands out as the clearly marked species which Miss Brackett and I were considering it until the Block Island and Cape May plants came to our attention. Many specimens were labeled and distributed by us as *E. halophila* and that binomial can now be revived:

E. **halophila** (Fernald & Brackett) Fernald & Brackett in herb. *E. uniglumis,* var. *halophila* Fernald & Brackett, Rhodora, xxxi. 72, t. 183 (1929). Figs. 12–14.

Eleocharis ambigens differs from *E. halophila* in the cartilaginous orifice of the sheath, paler, thinner and shorter scales (the reddish to castaneous firm and lustrous scales of *E. halophila* 3–5 mm. long),

more broadly obovoid or pyriform reticulate achene with lower and broader tubercle, the slender-conical to lanceolate tubercle of *E. halophila* being only 0.2–0.5 mm. broad at the bulbiform base. For comparison a sheath-orifice (FIG. 13), a spikelet (FIG. 12) and an achene (FIG. 14) from the type of *E. halophila* are shown in PLATE 387. The range of E. HALOPHILA was extended southward from Delaware by its discovery in VIRGINIA: wet sandy depressions, False Cape, June 20, 1935, *Fernald, Griscom & Long*, no. 4566.

E. SIMPLEX (Ell.) A. Dietr. Apparently now local: swampy and inundated woods, north of Blackwater River, no. 3764.

E. TUBERCULOSA (Michx.) R. & S. Common in damp peaty swales and depressions throughout the area; the following collected: south of Grassfield, no. 3762; Rifle Range, south of Rudy Inlet, no. 3763.

DICHROMENA COLORATA (L.) Hitchc. Local: inundated swales back of the dunes, south of False Cape, no. 3740, also *F. G. & L.*, no. 4573.

FIMBRISTYLIS PUBERULA (Michx.) Vahl, forma **pycnostachya**, f. nov. (TAB. 388, FIG. 3), spiculis valde confertis dense glomerulatis. TYPE: damp sandy flats back of the dunes, Rifle Range, south of Rudy Inlet, Princess Anne Co., Virginia, July 30, 1934, *Fernald & Long*, no. 3752 (in Gray Herb.). Also collected in inundated swales back of the dunes, south of False Cape, Princess Anne Co., no. 3753; and examined from Missouri and Oklahoma.

F. PUBERULA, forma **eucycla**, f. nov. (TAB. 388, FIG. 2), spiculis pedicellatis, obovoideis vel obovoideo-ellipsoideis apice valde rotundatis vel subtruncato-rotundatis. TYPE: swales back of the dunes, Rifle Range, south of Rudy Inlet, Princess Anne Co., Virginia, July 31, 1934, *Fernald & Long*, no. 3750 (in Gray Herb.). Also from the same locality, nos. 3747, 3748; and examined from Georgia (Tybee Island, *Harper*, no. 738; Cumberland Island, *Harper* no. 1544).

Typical *Fimbristylis puberula* (PLATE 388, FIGS. 1 and 4), as I understand it, has the spikelets narrowed at summit, either obtuse or subacute. It is of wide range, northward near the coast to Long Island and inland in the Mississippi drainage to Indiana, Illinois, Nebraska and Colorado. Some of the material of the interior has been separated as *F. interior* Britton, Ill. Fl. ed. 2, i. 320, fig. 785 (1913), because it has "Scales glabrous," whereas *F. puberula* was defined by Dr. Britton as having "Scales, at least the lower, pubescent or puberulent." *F. interior* was given a range from "Colorado and Nebraska to Texas." There are before me several sheets from Colorado, Nebraska and Kansas (as well as many from Oklahoma). The 3 sheets from Colorado all show, with a lens × 8, puberulent lower scales; the 2 from Kansas likewise show them, and 1 from

Photo. E. C. Ogden.

FIMBRISTYLIS PUBERULA: FIG. 4, umbel, × 1.
F. PUBERULA, forma EUCYCLA: FIGS. 1 and 2, plant, × 1.
F. PUBERULA, forma PYCNOSTACHYA: FIG. 3, umbel (glomerule), × 1.

Photo. E. C. Ogden.

FIMBRISTYLIS BALDWINIANA: inflorescences, × 1; spikelets, × 5; achenes, × 10.

Nebraska has them puberulent, another apparently not. Conversely, along the Atlantic coast the puberulence is often most evasive and seen only on the very youngest spikelets, if at all; consequently, in sending out the collections of L. F. and Fannie R. Randolph from North Carolina, the specimens which were young enough to show some puberulence were called *F. puberula* (*Randolph & Randolph*, no. 1024), those which were older were called *F. interior* (*R. & R.* no. 540).

Fimbristylis puberula, when lacking the puberulence, can best be told from *F. castanea* (Michx.) Vahl (the *F. spadicea* of continental American authors), by growing in small soft tufts, with thin and soft leaf-sheaths and (when properly collected) showing slender rhizomes and stolons, which in hard soil are not often collected. *F. castanea* forms dense tussocks, has dark coriaceous sheaths and is nonstoloniferous.

F. CASTANEA (Michx.) Vahl. Forming dense tussocks at borders of salt or brackish marshes: Wachapreague, Accomac Co., no. 3743; Lynnhaven, no. 3744.

FIMBRISTYLIS BALDWINIANA (Schultes) Torr. (PLATE 389). The plant of southeastern Virginia is quite typical, but in studying it I have taken the opportunity to compare it with the recently proposed *F. Darlingtoniana* Pennell, Bartonia, XV. 30 (1933). The two, as maintained by Pennell, differ as follows:

Achene pale yellow, finely and sharply striate-sulcate, about 1 mm. long; scales pale brown, green-ridged, dull or slightly shining, as wide as long, acute or slightly mucronulate, slightly bowed, wholly appressed; spikelets several, on the widely spreading rays of the simple or once-compound umbel; stem usually 2–3.5 dm. tall. . . . . 1. *F. baldwiniana*

Achene silvery white, striate or slightly sulcate, slightly more turgid, about 1.25 mm. long; scales dark brown, green-ridged, lustrous, strongly bowed and with tips loosely ascending; spikelets 1 to 6, on the ascending rays of the nearly always simple umbel; stem usually 0.5–2.0 dm. tall. . . . . 2. *F. darlingtoniana*

Fimbristylis Baldwiniana is maintained, rightly, for the plant of the Atlantic coastal plain, from Maryland to Florida and Texas. *F. Darlingtoniana* is supposed to be confined to "Serpentine Barrens of southeastern Pennsylvania, northeastern Delaware, and doubtless in adjacent Maryland." As illustrated by Pennell (his fig. 1) the achenes are quite different. In studying the material in the Gray Herbarium, including 11 sheets of *F. Darlingtoniana* from the serpentines of southeastern Pennsylvania and adjacent Delaware (two of them fine sheets from William Darlington himself) I find myself puzzled to keep this plant apart as a species. As a geographic variety it is

hardly separable, too many plants of the southern sands and granitic gravels having castaneous scales (FIGS. 18, 19, 22, 23), several of them having quite as large (FIGS. 24, 25) and as pale achenes; and in southeastern material, although the usually smaller and grayer achenes are commonly rougher, it is not unusual to find them embarrassingly smoothish (FIGS. 8, 24, 31), while quite roughened achenes are frequent in the material of *F. Darlingtoniana* (FIGS. 12, 17, 30).

As to the "several spikelets" on "widely spreading rays" of the umbel in *F. Baldwiniana*, as opposed to the only 1–6 spikelets "on the ascending rays" in *F. Darlingtoniana*, it is easy to find plants of the South with only 1–6 spikelets (Hyattsville, Maryland, September 30, 1912, *Holm;* Bedford Co., Virginia, September 4, 1871, *A. H. Curtiss;* North Landing, Norfolk Co., Virginia, *Fernald & Griscom*, no. 2772; Rosemont, Princess Anne Co., Virginia, *Fernald & Long*, no. 3756 (FIG. 13); Burke Co., North Carolina, *M. A. Curtis;* Leslie, Georgia, *Harper*, no. 405; Athens, Georgia, *Harper*, no. 68 (FIG. 22); Rock Hill, Florida, *Harper*, no. 92; etc.). Conversely, one of the Darlington sheets from West Chester, Pennsylvania has as many as 10 spikelets, while *Pennell's* from Williamson School (FIG. 9) has 9 and the rays are as widely divergent as in much southern material. In order to check the characters reputed to separate two species I have asked Mr. Ogden to reproduce the inflorescences and the details of several specimens. These are shown in PLATE 389. I am unable to sort these photographs into two piles representing different species.

FIMBRISTYLIS AUTUMNALIS (L.) R. & S., var. **mucronulata** (Michx.), comb. nov. *Scirpus mucronulatus* Michx. Fl. Bor.-Am. i. 31 (1803). *F. mucronulata* (Michx.) Blake, RHODORA, xx. 25 (1918).

Blake showed in 1918 that the type of *Scirpus autumnalis* L., upon which *Fimbristylis autumnalis* rests, is the plant with lance-ovoid spikelets in comparatively little-branched inflorescences, which was described in 1855 as *F. Frankii* Steud. Syn. Pl. Cyp. 111 (1855) and for which the name *F. geminata* Kunth (1837) is in current use; while the extreme with more slender spikelets in often more compound inflorescences is *F. mucronulata* (Michx.) Blake, based on *Scirpus mucronulatus* Michaux, which came from the Carolinas. In their extremes the two are easily distinguished, but so many transitions occur (in shape and size of spikelet, color of scales, size and roughening of achenes and degree of branching) that I am at a loss to see anything but two strong divergencies of one specific type. Those to whom tendencies are equivalent to species will maintain them as specifically

distinct. The identifications, as they come to the Gray Herbarium, indicate that no one has yet succeeded in stating differences between them which others can clearly interpret.

Scirpus Olneyi Gray. Abundant in saline or brackish marshes and even in fresh river-marshes, Princess Anne Co.: Lynnhaven, no. 3777; Blackwater River (fresh), *F. G. & L.*, no. 4574.

Rynchospora corniculata (Lam.) Gray. Local: in clay at border of swamp, Rosemont, no. 3784.

R. gracilenta Gray. Local in Norfolk Co.: wet, peaty clearings in woods of *Pinus serotina*, south of Grassfield, no. 3792.

Rynchospora gracilenta Gray, var. **diversifolia**, var. nov. (tab. 390, figs. 4–7), quam forma typica crassiore firmioreque ad 1 m. alto; foliis caulinis planis 1.5–2.5 mm. latis; cymis corymbiformibus terminalibus 1–1.5 cm. latis; spiculis 4–5.5 mm. longis; achaeniis 1.6–2 mm. longis, tuberculo 1.5–2.5 mm. longo.—Peats and wet sands of the Coastal Plain from Louisiana to Florida, north very locally to southern New Jersey. Type: swales back of the dunes, Rifle Range, south of Rudy Inlet, Virginia, July 31, 1934, *Fernald & Long*, no. 3796, in Gray Herb.

Typical *Rynchospora gracilenta*, very characteristic in its type-locality, the Pine Barrens of New Jersey, has the leaves all capillary or the cauline at most linear-involute and up to 1 mm. broad, the terminal cymes only 3–10 mm. broad, the spikelets 3–4 mm. long, achenes 1.2–1.5 mm. long and tubercle 0.8–1.4 mm. long. Its details are shown in figs. 1–3. Var. *diversifolia* has the leaves of the basal tufts capillary as in the typical form of the plant, but is quickly distinguished from it by its stiffer habit, broadish cauline leaves, and longer spikelets, fruits and tubercles. Several collections from Louisiana, Florida and Georgia belong to it and at least one from New Jersey: Quaker Bridge, August 18, 1866, *Diffenbaugh*.

Typical slender-leaved *Rynchospora gracilenta* was collected in wet, peaty clearings in woods of *Pinus serotina*, south of Grassfield, Norfolk Co., no. 3792.

Rynchospora glomerata (L.) Vahl. In 1918 Dr. S. F. Blake showed[1] that typical *R. glomerata* is the coarse southern plant which had been called *R. glomerata*, var. *paniculata* (Gray) Chapm., while the somewhat smaller plant, which extends northward to Nova Scotia, New Brunswick, New England, northern New York, southern Ontario and Wisconsin, he identified with *R. capitellata* (Michx.) Vahl. Dr. Blake clearly established, through typical specimens sent to European herbaria, the identity of the coarse southern plant; the

[1] Blake, Rhodora, xx. 25–28 (1918).

identity of the smaller northward-ranging plant was less finally settled. At that time Blake was quite satisfied that the two were distinct species, saying: "The more northern plant, which has passed as true *glomerata*, has an achene 1.5 mm. long (including the crustaceous 'perianth'-base, but excluding the style) and 0.8 mm. wide, while in the more southern var. *paniculata* the achene is 2 by 1.5 mm. and much more umbonate. In the southern plant, moreover, the spikelet is usually 1-fruited, in the northern plant 2–3-fruited, as long ago noted by Kunth (Enum. ii. 296 (1837)) in describing the southern form as *R. glomerata* var. *robustior*. This difference in size and shape of achenes, which runs with great constancy through a series of more than 115 collections of the two plants, in combination with other differences in size of plant, breadth of leaf, looseness of inflorescence, and number of achenes in the spikelet fully confirms the specific distinctness of the two plants."

Nevertheless, although the more northern plant can hardly be confused with the largest extreme of the more southern, two trips to southeastern Virginia where both grow, first in September, 1933 with Mr. Ludlow Griscom, then with Mr. Bayard Long in late July and early August, 1934, have led me to a close study of the group with the hope of finding the clear differentiations emphasized by Blake but not satisfactorily evident in the field. As a result of this study I am forced to the decision that Asa Gray's later treatment of *R. glomerata* as a variable species, including both the northern and the southern extremes, was better justified than his earlier and less experienced judgment, that the latter were distinct species.

From inflorescences of the largest and most branching of true *Rynchospora glomerata* I get achenes with variation in size much greater than found by Blake: a range of 1.7–2 mm. in length and of 0.8–1.5 mm. in breadth. In fact, I take the extreme breadth, 1.5 mm., from Blake's statement; I have measured none exceeding 1.4 mm. The tubercle in this large southern extreme varies from 1–1.8 mm. long. As to the 1-flowered spikelets, ordinarily they are so; but it is not difficult to find them with 2 flowers, for instance in an Arkansas specimen (Grand Prairie, *Harvey*, no. 13) which Blake has specially annotated as *R. glomerata*. It, like several other sheets of the latter, exhibits 2-flowered as well as 1-flowered spikelets.

In the northern plant, *Rynchospora capitellata* of Blake's treatment, I have taken achenes from the most northeastern material, from Nova Scotia, New Brunswick and New England. I find it difficult

Photo. E. C. Ogden.

RYNCHOSPORA GRACILENTA: FIG. 1, plant, × 2/5; FIG. 2, inflorescence, × 2; FIG. 3, achene, × 10.

R. GRACILENTA, var. DIVERSIFOLIA: FIG. 4, plant, × 2/5 (TYPE); FIG. 5, inflorescence, × 2; FIGS. 6 and 7, achenes, × 10.

Photo. E. C. Ogden.

RYNCHOSPORA AXILLARIS: FIG. 1, TYPE, × ¾, from photograph supplied by Professor H. HUMBERT.

R. CEPHALANTHA: FIG. 2, inflorescence, × 1; FIG. 3, achene, × 10.

R. MICROCEPHALA: FIG. 4, inflorescence, × 1; FIG. 5, achene, × 10.

to get any to meet the stated specifications: 1.5 mm. long, 0.8 mm. wide. Instead, I find a variation of 1.5–1.8 mm. in length, of 0.8–1.2 mm. in breadth; while the tubercle ranges from 0.8–1.2 mm. long.

These measurements, it will be noted, all overlap. As a result I find it impossible, without further illumination, to retain *Rynchospora capitellata* as a good species. Its first available varietal name is *R. glomerata*, var. *minor* Britton, Trans. N. Y. Acad. Sci. xi. 87 (1892). At the same time (p. 88) Britton published *R. glomerata*, var. *leptocarpa* Chapm. for a plant of the southern Coastal Plain. The slight difference in the shape of the achene, the remote and few axillary cymes and the narrow leaves of the latter all appear sporadically in the North, but for the main series of the latter area the name var. *minor* is without question. Var. *leptocarpa*, although it seems to me unworthy special recognition, is maintained by Blake; and Small elevates it to specific rank, as *R. leptocarpa* (Chapm.) Small, Man. 181, 1503 (1933).

Throughout the genus the direction of the barbs or serratures on the bristles is very fickle, as it is in *Eleocharis* and *Scirpus*. From the same areas one can get retrorsely or upwardly barbed bristles or even those which are perfectly smooth. Such divergencies from the ordinary are most interesting but they do not constitute true varieties (as I use the term). As forms they are adequately and more satisfactorily covered. My own interpretation of *Rynchospora glomerata* is covered by the following key.

a. Culms stoutish, 0.5–2 m. high; leaves 3–7 mm. broad; inflorescence 0.3–1 m. long, its axillary peduncles freely forked; spikelets 5–6 mm. long, most often 1 (sometimes 2)-flowered; achenes 1.7–2 mm. long, 0.8–1.5 mm. broad; tubercle 1–1.8 mm. long..... Var. *typica*.

a. Culms rather slender, 0.1–1.5 m. high; leaves 0.5–4 mm. broad; inflorescence 0.2–6 dm. long, its axillary peduncles less forked or simple; spikelets 3–5 mm. long, usually 2–3-flowered; achenes 1.5–1.8 mm. long, 0.8–1.2 mm. broad; tubercle 0.8–1.2 mm. long....*b.*

b. Bristles serrulate or barbed.
Bristles retrorsely barbed..... Var. *minor*.
Bristles upwardly barbed..... Var. *minor*, forma *controversa*.

b. Bristles smooth..... Var. *minor*, forma *discutiens*.

R. GLOMERATA (L.) Vahl, var. **typica**. *Schoenus glomeratus* L. Sp. Pl. i. 44 (1753). *R. glomerata* (L.) Vahl, Enum. ii. 234 (1805); Blake, RHODORA, xx. 26, fig. 1 (1918). *R. paniculata* Gray, Ann. Lyc. N. Y. iii. 211, t. vi. fig. 21 (1835), not Presl (1828). *R. glomerata*, var. *robustior* Kunth, Enum. ii. 296 (1837). *R. glomerata*, var. *paniculata* (Gray) Chapm. Fl. So. States, 528 (1860); Britton, Trans. N. Y. Acad. Sci. xi. 88—repr. 15 (1892).—Florida to Texas, north to Delaware, Maryland, Tennessee, Arkansas and Oklahoma.

Var. MINOR Britt. Trans. N. Y. Acad. Sci. xi. 88—repr. 15 (1892). *Schoenus capitellatus* Michx. Fl. Bor.-Am. i. 36 (1803), in part. *R. capitellata* (Michx.) Vahl, Enum. ii. 235 (1805); Blake, RHODORA, xx. 27 (1918). *R. glomerata* Gray, Ann. Lyc. N. Y. iii. 217, t. vi. fig. 29 (1835) and later authors up to 1918. *R. glomerata*, var. *leptocarpa* Chapm. in Britt. l. c. (1892), the slenderest state, of swampy woods and thickets. *R. capitellata*, var. *minor* (Britt.) Blake, RHODORA, xx. 28, fig. 2 (1918). *R. capitellata*, var. *leptocarpa* (Chapm.) Blake, l. c. fig. 5 (1918). *R. leptocarpa* (Chapm.) Small, Man. 181, 1503 (1933).—Florida to Texas, north to Nova Scotia, New Brunswick, northern New England, northern New York, southern Ontario and Wisconsin.

Var. MINOR, forma **controversa** (Blake), comb. nov. *R. capitellata*, var. *controversa* Blake, RHODORA, xx. 28, fig. 3 (1918). *R. Smallii* Britt. in Small, Fl. Se. U. S. 1321, 1327 (1903).—Scattered in the range of var. *minor*, New Jersey and eastern Pennsylvania to North Carolina.

It is significant of the overemphasis which has been placed on the fickle characters of the bristles (as to their barbing) that Britton should have treated *R. glomerata*, var. *discutiens* and *R. capillacea*, var. *leviseta* (both with smooth instead of retrorsely barbed bristles) as mere varieties or as unworthy recognition (Ill. Fl. ed. 2) and *R. cephalantha* Gray (*R. axillaris* Britt. as to plant, not *Schoenus axillaris* Lam.) with upwardly (instead of retrorsely) barbed bristles as apparently nonexistent, while *R. glomerata*, var. *minor* with the bristles upwardly barbed was treated as a distinct species.

In fact, *R. cephalantha* (PL. 391, FIGS. 2 and 3) has the bristles either upwardly or downwardly serrulate in the same colony. When he described this species Gray, Ann. Lyc. N. Y. iii. 219 (1835), said of it: "A most remarkable circumstance with regard to this species, and so far as my observation extends, peculiar to it, is the diversity in the direction of the hispidness of the bristles: even in different individuals from the same cluster some of the bristles are hispid upward and others downward."

As to var. *leptocarpa*, as already stated, I can find no character of sufficient definiteness to keep it apart. Plants of the southern Coastal Plain, wandering into swampy woods and thickets (instead of growing in the open habitats) become attenuated in all parts and paler and seem to be what Chapman originally had. To me they are merely "drawn" and narrow-leaved responses to unfavorable conditions.

Var. MINOR, forma **discutiens** (Clarke), comb. nov. *R. glomerata*, var. *discutiens* Clarke in Britt. Trans. N. Y. Acad. Sci. xi. 88 (1892). *R. capitellata*, var. *discutiens* (Clarke) Blake, RHODORA, xx. 28, fig. 4

(1918).—Occasional, often abundant, in the range of typical var *minor*, Nova Scotia to Wisconsin and North Carolina.

An explanation is necessary regarding *Rynchospora axillaris* (Lam.) Britt. Lamarck gave the briefest of diagnoses:

> 643. Schoenus *axillaris*.
> S. culmo triquetro folioso, corymbis minimis alternis axillaribus, spiculis confertis.
> E. Carolina. *D. Fraser.*

Kunth, whose *Rynchospora glomerata* included the smaller var. *minor*, i. e. *R. capitellata*, and who called the largest southern extreme (which Blake has shown to be true *R. glomerata*) *R. glomerata*, β. *robustior*, had no hesitation in placing *Schoenus axillaris* in the synonymy of his *R. glomerata:* "Schoenus axillaris *Lam. Ill.* 1. 137. (*fide herb. Willd.*)"— Kunth Enum. ii. 296 (1837); and he recognized *R. cephalantha* Gray, Ann. Lyc. N. Y. iii. 218 (1836), without doubt, as a distinct species (Kunth. l. c. 540). But Boeckeler, who had a very confused conception of American *Cyperaceae*, completely tangled matters. I do not venture to untangle his snarls, further than to point out that he took up *R. cephalantha* as a species and in its synonymy placed three wholly different species which no one knowing *Rynchospora* would merge with the almost unique *R. cephalantha* (pl. 391, figs. 2 and 3). Boeckeler's synonymy of his *R. cephalantha* was: "*R. glomerata* Kunth, 296 partim.—*R. distans* Willd. herb. no. 1141, f. 1.—*Schoenus axillaris* Lam. (fide specim. in Herb. Willd.)—*Schoenus capitellatus* Michx. l. c. 36 (v.s.)." That is certainly a catholic view of a species: as to *R. glomerata* see above; *R. distans* (Michx.) Vahl is a very different species of the southern coastal plain and the West Indies, with nearly filiform leaves and tiny inflorescences; *Schoenus capitellatus* is, as already sufficiently emphasized, the wide-ranging plant, extending northward into Canada, which has long passed (erroneously) as typical *R. glomerata;* and Kunth had explicitly stated that *S. axillaris* was the same as *S. capitellatus*. Nevertheless, notwithstanding Boeckeler's complete misunderstanding of *R. cephalantha*, the latter species was submerged by Britton wholly on the basis of Boeckeler's misinterpretation:

> "Rhynchospora axillaris (Lam.) (*Schoenus axillaris*, Lam., Encyc. i., 137 (1791); *R. cephalantha*, Gray, Ann. Lyc. N. Y. iii., 218 (1836). In taking up the name I am guided by Boeckeler in Linnaea, xxxvii., p. 572, who states that he saw a specimen named by Lamarck in Willdenow's Herbarium."—Britton, Bull. Torr. Bot. Cl. xv. 104 (1888).

Since all other species referred by Boeckeler to his *Rynchospora*

cephalantha are surely not conspecific with it, it has seemed important to learn exactly what Lamarck had before him when he described *Schoenus axillaris*. This, happily, has been possible through the great kindness of Professor Humbert of the Muséum National d'Histoire Naturelle in Paris, who has supplied me with a photograph of Lamarck's type (our PL. 391, FIG. 1). The specimen is hopelessly young, a mere fragment from a very young inflorescence, but that it is not *R. cephalantha* (FIGS. 2 and 3) is perfectly apparent.

Personally I cannot match it with any degree of certainty. Its prolonged bracts, much longer than in any *mature* material known to me, and its wholly immature spikelets are so nearly impossible to match, that, in a genus with specific characters chiefly in the mature achenes it would be very unwise to attempt to displace a well defined specific name by the essentially unrecognizable *R. axillaris* (Lam.) Britton, as to type.

It thus seems clear that, in spite of the unfortunate synonymy given by Boeckeler and the faith in his judgment shown by Britton, *Rynchospora cephalantha* stands out as a species free from earlier nomenclatural entanglements. One later such alliance, however, needs dissolving. This is *R. axillaris*, var. *microcephala* Britton, Trans. N. Y. Acad. Sci. xi. 89—repr. 16 (1892) or *R. microcephala* Britton in Small, Fl. Se. U. S. 195 and 1327 (1903). This was originally defined merely as having "Heads smaller; spikelets only about 1 mm. wide" and was maintained as a small-headed extreme of *R. axillaris* in Britton & Brown, ed. 1, and by Robinson & Fernald; Small took it up in 1903 as a species, ascribing it to Britton, but in 1913 (Ill. Fl. ed. 2) Britton repudiated it, placing it, as *R. axillaris microcephala* in the synonymy of his *R. axillaris* and not mentioning *R. microcephala*. Britton's later view was apparently covered by the comment under *R. axillaris:* "Southern races have much smaller heads and smaller achenes than northern ones."

In geographic range I find little difference. Typical *Rynchospora cephalantha* (*R. "axillaris"* of Britton's treatment) extends from Mississippi to Florida, thence to Long Island; *R. microcephala* is also in Mississippi and Florida, but its northern range stops in New Jersey. But the two seem as distinct as any two paired species of *Rynchospora*. I make out the following diagnostic points which seem to indicate that they are not merely large and small variations of a single species but are quite separate entities.

R. CEPHALANTHA. Inflorescence occupying less than 1/3 the height of

the plant, glomerules strictly terminal or in 1–3(–4) of the upper axils; spikelets 5–7 mm. long; achenes 2.2–2.6 mm. long, 1.4–1.6 mm. broad. FIGS. 2 and 3.

R. MICROCEPHALA. Inflorescence occupying 1/3–2/3 the height of the plant, glomerules in 2–6 of the upper axils; spikelets 3–4 mm. long; achenes 1.5–2 mm. long, 0.8–1.2 mm. broad. FIGS. 4 and 5.

So far as I have been able to determine, the measurements of spikelets and achenes do not merge. An inflorescence of *R. cephalantha* × 1, is shown in FIG. 2, of *R. microcephala*, × 1, in FIG. 4; an achene of *R. cephalanatha*, × 10, in FIG. 3, of *R. microcephala*, × 10, in FIG. 4. The illustrations of *R. microcephala* are from *Fernald & Long*, no. 3785, from pine barrens south of Grassfield, Norfolk Co., Virginia.

R. FASCICULARIS (Michx.) Vahl. Local: wet peaty depressions in sandy pineland, The Desert, Cape Henry, nos. 3789, 3790.

Apparently the first record from north of North Carolina.

R. WRIGHTIANA Boeckl. Local: damp sandy and peaty depressions back of the dunes, Rifle Range, south of Rudy Inlet, no. 3797, also *F. G. & L.*, no. 4577, there associated with *R. rariflora.*

The first record of *R. Wrightiana* from north of North Carolina.

R. RARIFLORA (Michx.) Ell. With the last, abundant and forming dense tussocks, no. 3791, also *F. G. & L.*, no. 4576.

R. CYMOSA Ell., var. GLOBULARIS Chapm. Local: same locality as the two preceding, no. 3794, also *F. G. & L.*, no. 4575; typical R. CYMOSA in clay ditches bordering pine woods, Virginia Beach, no. 3795.

R. CADUCA Ell. Margin of thicket bordering inundated swale back of the dunes, south of False Cape, no. 3800; boggy swale by Northwest River, Northwest, *F. G. & L.*, no. 4578.

Slight extension northward, from North Carolina.

R. INEXPANSA (Michx.) Vahl. One of the common species of wet thickets and peats: Pungo Causeway, *F. & G.*, no. 2775; Blackwater River, no. 3799; Dam Neck, no. 3798.

Spikelets often altered into finely echinate spherical galls.

CLADIUM JAMAICENSIS Crantz. Local: border of inundated woods north of Blackwater River, no. 3801.

Although already known from southeastern Virginia, the giant Saw Grass is not common there. The only place we saw it was slightly north of the Blackwater in the flooded woods bordering North Landing River, where it makes a characteristic growth.

SCLERIA SETACEA Poir. Damp sandy and peaty depressions back of the dunes, Rifle Range, south of Rudy Inlet, no. 3803.

CAREX MUHLENBERGII Schkuhr. Apparently frequent in woods:

Cape Henry, nos. 3816, 3818, also *F. & G.*, no. 2781; Little Neck, no. 3817.

Taller, less cespitose and with more prolonged rhizome than much of the New England plant.

C. ABSCONDITA Mackenz. Very common in woods, either wet or dry: Blackwater River, no. 3808; Little Creek, *F. & G.*, no. 4333; Little Neck, *F. G. & L.*, nos. 4593, 4594; Great Neck, *F. & G.*, nos. 4334, 4335.

Our plant is typical *C. abscondita* (*C. ptychocarpa* Steud., not Link). Mackenzie treats the largest extreme from Florida as a distinct species, his *C. magnifolia*, and separates it from *C. abscondita* by its having leaves "1.5–3.5 dm. long; perigynium 4–4.5 mm. long, the sides 2 mm. wide, the beak 1 mm. long,"[1] whereas *C.. abscondita* is characterized by shorter leaves, "perigynium 2.5–3.5 mm. long, the sides 1.5 mm. wide, essentially beakless." As a large extreme *C. magnifolia* is pronounced, but those who wish some morphological character for a species will treat it as a variety of *C. abscondita.* Chapman, who first described it, called it a variety (of *C. digitalis*) and Bailey treated it as a variety of *C. ptychocarpa.* Plenty of specimens from the northeastern limits of *C. abscondita* have leaves 3.5 dm. long (Purgatory Swamp, Norfolk Co., Mass., many collections) and at its northwestern limit (in Indiana) it often has perigynia 4 mm. long, while material from Hampton, Virginia, with perigynia up to 4 mm. long, has some of them scarcely, others very definitely beaked. As a variety the extreme plant of Florida is worthy recognition; as a species surely not. It is

C. ABSCONDITA Mackenz., var. **glauca** (Chapm.), n. comb. *C. digitalis*, var. *glauca* Chapm. Fl. So. U. S. 541 (1860). *C. ptychocarpa*, var. *macrophylla* Bailey, Mem. Torr. Bot. Cl. i. 48 (1889). *C. magnifolia* Mackenzie in Small, Fl. Se. U. S. ed. 2: 1375 (1913).

C. VENUSTA Dew., var. MINOR Boeckl. (*C. oblita* Steud.). Local: wet peaty clearings in woods of *Pinus serotina*, south of Grassfield, no. 3806.

C. WALTERIANA Bailey, var. BREVIS Bailey. Swampy or inundated woods: Blackwater River, no. 3807; Cape Henry, *F. & G.*, no. 4345.

C. LUPULINA Muhl. Alluvial woods and thickets, and ditches, frequent: Rosemont, no. 3811; Virginia Beach, *F. G. & L.*, no. 4596.

LEMNA PERPUSILLA Torr. Fresh to brackish waters, Princess Anne Co.: Owl Creek, Virginia Beach, no. 3823.

L. VALDIVIANA Phil. Fresh to brackish waters, Princess Anne Co.: Dam Neck, no. 3824, also *F. & G.*, no. 4353.

SPIRODELA POLYRRHIZA (L.) Schleid. Fresh to brackish waters,

[1] Mackenzie in Small, Man. 198 (1933).

Princess Anne Co.: False Cape, no. 3825, also *F. G. & L.*, no. 4598; Lake Joyce, *F. G. & L.*, no. 4599.

COMMELINA COMMUNIS L. Ditches and wet roadsides, common: Macon's Corner, Princess Anne Co., *F. & G.*, no. 2803.

C. HIRTELLA Vahl. Swampy woods and thickets back of the dunes, along Back Bay, False Cape, no. 3832.

HETERANTHERA RENIFORMIS R. & P. Swampy and inundated woods, north of Blackwater River, no. 3833.

JUNCUS EFFUSUS L., var. SOLUTUS Fern. & Wieg. Wet woods and thickets, common: Virginia Beach, no. 3847.

J. EFFUSUS, var. COSTULATUS Fern. Equally common: south of Grassfield, no. 3846.

J. DEBILIS Gray. Wet, peaty clearing in woods of *Pinus serotina*, south of Grassfield, no. 3838.

J. MEGACEPHALUS M. A. Curtis. Inundated swales back of the dunes, south of False Cape, no. 3841.

This station is very near if not exactly that of *R. M. Harper:* "damp hollow between beach and dunes, on coast of Princess Anne Co., about 2 miles n. of state line," July 23, 1918. Besides in the characters usually noted, *Juncus megacephalus* differs from *J. scirpoides* in the larger and more delicate bractlets of the flowers, in the more slender and pointed seeds and in the apparent lack of the whitish finger-like stolons which are so characteristic of the latter. Small (Man.) notes that it is calcicolous. Our material was from slightly brackish sand; and sheets in the Gray Herbarium, which indicate such details of habitat, give the following data: among lime-sinks, Lee Co., Georgia, *Harper,* no. 925; in brackish swamps, Florida, *Chapman;* wet sandy shore of Gulf, Apalachicola, with *Scirpus pungens Spartina patens, Spiranthes graminea, Samolus ebracteatus, Chapman* in Engelm. Herb. Junc. Bor.-Am. Norm., no. 68. Many labels indicate inconclusively ditches, dune-hollows, pine-barrens, prairies, etc.

J. ELLIOTTII Chapm. Damp sandy flats back of the dunes, Rifle Range, south of Rudy Inlet, no. 3837, also *F. G. & L.*, no. 4605.

Although apparently not recorded from north of North Carolina, *Juncus Elliottii* was collected in Elizabeth City County, VIRGINIA, in 1912: roadside ditches, Buckroe and border of marsh between Buckroe and Hampton, *B. L. Robinson,* nos. 316, 317. It has also been collected in one of the famous spots of DELAWARE: border of wet ditch, south of Ellendale, Sussex Co., June 23, 1909, *Bayard Long.* When carefully collected, *J. Elliottii* displays beautiful fusiform tuberous enlargements of many of the elongate roots.

UVULARIA PUBERULA Michx., var. **nitida** (Britton), comb nov. *Oakesia sessilifolia,* var. (?) *nitida* Britton, Trans. N. Y. Acad. Sci.

ix. 13 (1889). *U. sessilifolia nitida* (Britton) Morong, Mem. Torr. Bot. Cl. v. 111 (1894). *U. nitida* (Britton) Mackenz. Torreya, viii. 14 (1908). Plate 392, figs. 2, 3 and 6.

When Mackenzie separated *Uvularia nitida* as a species he correctly emphasized "the close relationship existing between the mountain bellwort (*U. puberula*) and our pine-barren plant" and he gave the distinctions which he found in tabular form, as follows:

	U. nitida	*U. puberula*
Capsule	Sessile, 17 mm. long	Sessile, 24 mm. long
Style	Slender, much exceeding the anthers	Thick, little exceeding the anthers
Leaves	Subcordate, very green on both sides, thinnish, not strongly reticulate-veined; margins minutely serrulate	Subcordate, very green on both sides, thick, strongly reticulate-veined; margins serrulate
Stem angles	Essentially smooth	Serrulate and puberulent

In further discussion Mackenzie said "From the above it may be noted that the differences between *U. nitida* and *U. sessilifolia* are very pronounced, while those between *U. nitida* and *U. puberula* are much more slight. This last-named species is variable, and incomplete specimens from the South, in the Columbia University herbarium, show a close approach to *U. nitida*. The species, however, as a rule, seem decidedly distinct, when represented by good specimens. The style character is apparently especially constant, although it may depend to some extent on the age of the flowers."

I have not had the advantage of knowing the plants in the field but specimens in the Gray Herbarium at once indicate that the capsules of *Uvularia puberula* are not merely "24 mm. long." On fruiting plants from the mountains of Virginia, West Virginia, North Carolina, South Carolina and Tennessee they range from 1.5 to 3.3 cm. long. One number, *Steele & Steele*, no. 286, in the Gray Herbarium, collected September 12th and consequently mature, consists of two fruiting plants, one with a capsule orthodox (2.4 cm. long), the other with it 1.6 cm. long (fig. 1), smaller than Mackenzie allowed for his *U. nitida*. As to the comparative length of style and anthers I find this situation. Material of *U. nitida* from South Lakewood, Ocean Co., New Jersey (*Mackenzie*, no. 4556) has the long style (fig. 2) as prescribed; but another New Jersey sheet, Tom's River, May 30, 1907, *Eggleston*, has the anthers much overtopping the common style (below its forking), as shown in fig. 3.

Turning to the Alleghenies of West Virginia, I find a sheet of perfectly good *Uvularia puberula*, from White Sulphur Springs, May 14

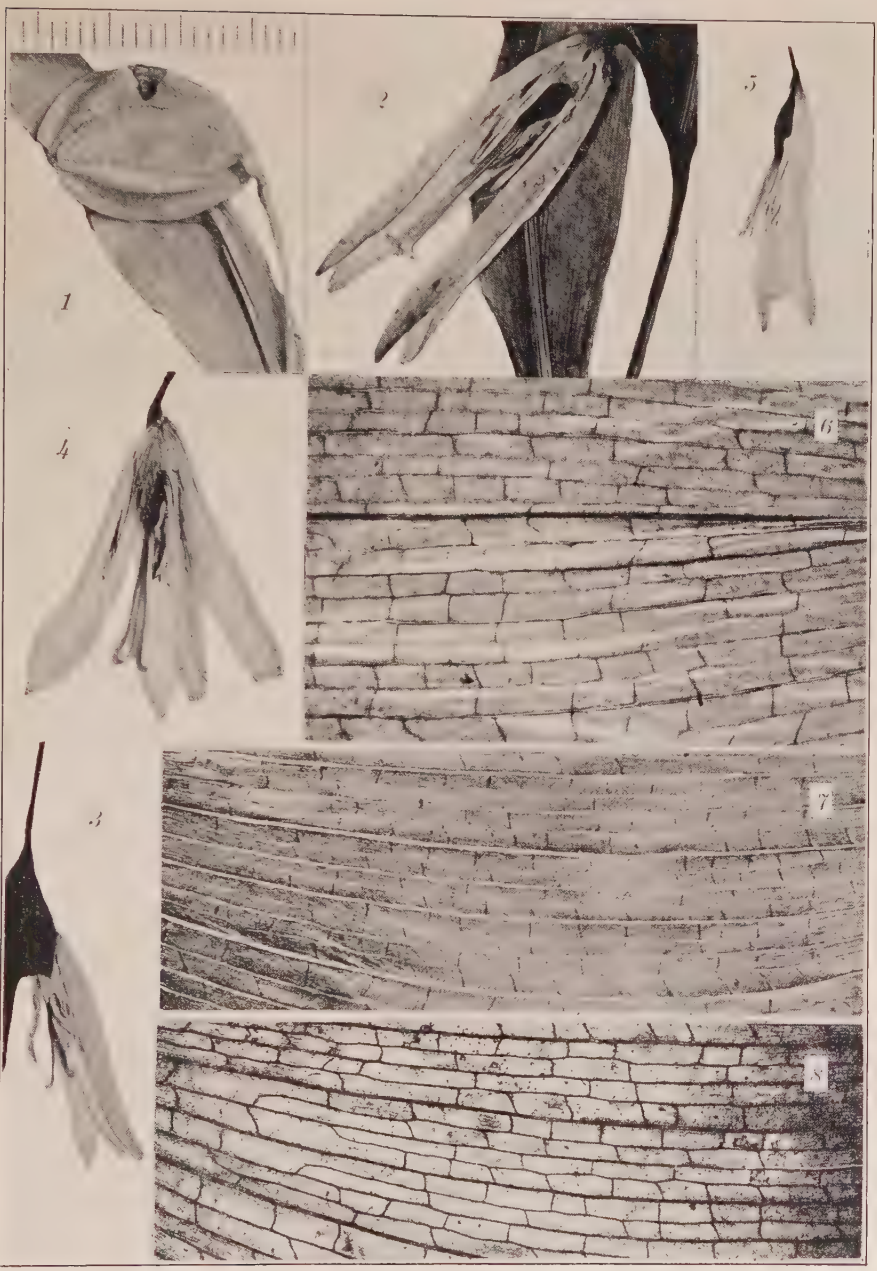

Photo. E. C. Ogden.

Uvularia puberula: fig. 1, exceptionally small fruit, × 1.8; fig. 4, flower, showing long style, × 1.8; fig. 5, flower, showing relatively long anthers, × 1.8; fig. 7, lower surface of leaf, by reflected light, × 5; fig. 8, reticulation of same leaf, by transmitted light, × 5.

U. puberula, var. nitida: fig. 2, flower, showing long style, × 1.8; fig. 3, flower, showing relatively long anthers, × 1.8; fig. 6, lower surface of leaf, × 5.

Photo. H. G. Fernald.

Hypoxis Longii: fig. 1, fruiting plant, × 1; fig. 2, flower, × 5; fig. 3, flower, mechanically opened, × 10; fig. 4, summit of capsule, × 10; fig. 5, dehisced fruit, with seeds, × 10; fig. 6, valves of capsule, × 10; figs. 7 and 8, seeds, × 12.

to 17, 1914, *Hunnewell*, with three flowering plants. I have removed the covering sepals from two flowers; one of them (FIG. 4) has the style elongate as in theoretical *U. nitida*, the other (FIG. 5) has the short style and long anthers of the Tom's River sheet of *U. nitida*. The styles, like the capsules, fail to give the sharp differentiation one would wish between *U. puberula* and *U. nitida*. In fact, it becomes evident that *U. puberula* (including *nitida*) exhibits heterostyly.

The leaves of *U. nitida* are, as Mackenzie maintained, thinner than in *U. puberula* and the reticulation is less prominent on the back; but it is of the same pattern. FIG. 6 shows the pattern of the reticulation, × 5, by reflected light of a leaf from some of Britton's original collection of his *Oakesia sessilifolia*, var. *nitida;* FIG. 7, the pattern, × 5, also by reflected light (showing shadows), from a leaf of *U. puberula* from Henderson Co., North Carolina (*Wiegand & Manning*, no. 856, as *U. sessilifolia*); and FIG. 8 is a portion of the same leaf photographed by transmitted light, × 5. The reticulate pattern is not sufficiently different for species.

Somewhere on the angles of the stems of *Uvularia puberula* one can usually find puberulence; the angles in *U. nitida* are glabrous. So far as I can make out this and the thinner leaf with reticulation less prominent beneath are the characters which separate *U. nitida*. I am, therefore, treating it as a variety of the coastal plain. The occurrences on the outer coastal plain of isolated colonies of Alleghenian types and the persistence in the Alleghenies of relic colonies of coastal plain types are so numerous that it is not unnatural that *Uvularia puberula* should have its coastal plain representative.

Kearney reported *U. puberula*, var, *nitida* (as *U. sessilifolia nitida*) from Suffolk, where many pine-barren species occur.[1]

UVULARIA SESSILIFOLIA L. Dry clay of open woods and thickets, north of Blackwater River, no. 3860.

SMILAX TAMNIFOLIA Michx. Wet woods near Great Bridge, no. 3856.

DIOSCOREA VILLOSA L. *D. paniculata* Michx.; Bartlett, U. S. Dept. Agric. Bur. Pl. Ind. Bull. no. 189: 15, map 3 (1910). Wet woods, south of Great Bridge, Norfolk Co., no. 3861; and seen in several other stations in Norfolk and Princess Anne Cos.

Bartlett rejected the name *Dioscorea villosa*, because he felt that the specific name was applied to the plant of northeastern America

[1] Fruiting material (*Fernald, Long & Fogg*, no. 4843) collected September 11, 1935 on a bank in dry woods at Kilby (slightly west of Suffolk) is typical Alleghenian *U. puberula*, with the firm leaves superficially reticulate beneath, the mature capsules 2.2–3.3 cm. long.

through confusion with some other and truly villous species. He admitted that the Clayton plant from Virginia (no. 94), which had been described by Gronovius and which Linnaeus had personally examined, had been accepted as the type. In view of the general confusion of citations given by Linnaeus for this, like a large proportion of his American species, the typification becomes highly abstract unless we accept the specimen which Linnaeus had had before him as final. In this case the typification had already been made and only confusion results by shifting it.

In his map and his citation of specimens, although admitting that Clayton's plant (presumably from southeastern Virginia) was what he chose to call *D. paniculata*, Bartlett gave no entries from south of Maryland. Our material, perfectly typical of the plant with pilose leaves, comes from within 10 miles of the North Carolina line, from the swampy area known as "The Green Sea," between Great Bridge and Benefit.

Hypoxis **Longii**, sp. nov. (tab. 393), cormo cylindrico 0.7–1.2 cm. crasso; foliis linearibus firmis 1.5–3.5 dm. longis 2–4 mm. latis sparse villosis, vaginis membranaceis griseo-brunneis; pedunculis filiformibus pilosis anthesi vaginis inclusis deinde elongatis ad 6 cm. longis unifloris; bracteis 1–2 lineari-filiformibus 3–4 mm. longis caducis; floribus inclusis clausis; ovario 3–4 mm. longo clavato dense albido-piloso; sepalis lanceolatis 3 mm. longis 1 mm. latis dorso pallide viridibus longe piloso barbatisque, ventro albidis 5-nerviis; petalis albidis lanceolatis 2 mm. longis 0.5 mm. latis; antheris basifixis lanceolato-attenuatis, 0.8–1 mm. longis, basi cordatis; capsulis crasse clavatis 0.8–1 cm. longis 3–4 mm. latis sepalis albido-villosis conniventibus 4–5 mm. longis coronatis, apice mox circumscissis inferne valvis tribus dehiscentibus, sepalis caducis; seminibus crasse cylindricis vel anguste obovoideis 1.5–2 mm. longis diametro 0.8–1 mm. latere hilo rostrato conspicuo, testa olivaceo-nigrescentibus iridescentibus minute alveolatis.—Virginia: damp peaty or sandy depressions back of the dunes, Rifle Range, south of Rudy Inlet, Princess Ann County, August 4, 1934, *Fernald & Long*, no. 3862 (type in Gray Herb.; isotype in Herb. Phil. Acad.), June 16, 1935, *Fernald, Griscom & Long*, no. 4609.

Hypoxis Longii is, in several characters, the most extreme American species of the genus. Ordinarily the American species have the capsules quite indehiscent and permanently crowned by the connivent perianth-segments which form a beak. So generally is this the case that a botanist familiar with the Atlantic North American *H. hirsuta* (L.) Coville or the common tropical American *H. decumbens* L., is puzzled by the definition given in certain Old World treatments of *Hypoxis:* "In Hypoxis it [the fruit] is a capsule which slits off by

circumscissile dehiscence below the operculum, and then sometimes, but not always, breaks up into three loculicidal valves"—Baker, *A Synopsis of Hypoxidaceae*, Journ. Linn. Soc. xvii. 97 (1878); and "Capsula . . . demum (an semper?) subapice circumscisse dehiscens"—Benth. & Hook. Gen. Pl. iii. 717 (1880). More consistent with our usual American experience is the definition of Hutchinson: "Fruit either a capsule and mostly crowned by the persistent perianth, opening by a circular slit or by short vertical slits near the top, or indehiscent and fleshy"—Hutchinson, Fam. Fl. Pl. ii. Monoc. 166 (1934).

When we first detected *Hypoxis Longii* the feature which attracted us was a remarkable membranous, white and 3-cleft structure (FIG. 6) which appeared like a 3-parted perianth, involucre or spathe. Soon we found some (FIG. 5) bearing the long central placenta covered with olive-black seeds, looking like a spadix with rudimentary flowers; and finally we got plants with flowers in all stages from anthesis (FIG. 2) to maturity of the capsules (FIGS. 1 and 4). The flowers (FIG. 1) hidden in the sheaths, did not expand, but the scape promptly elongated, the capsule enlarged and we could only conclude that we were dealing with a cleistogamous species. Digging specimens from the peat we were amazed to see the perianth-segments promptly drop off and the three white valves of the capsule as promptly separate and roll back, exposing the seed-covered placenta. The disturbance caused by removing the plants from the soil so promptly induced this startling reaction, completed in a few seconds, in all full-grown capsules that we found it difficult to secure material young enough to retain the flowers and capsules intact. That was early in August, 1934, when flowers and fruits in all stages were present. In May, 1935, Mr. Griscom and I could find no signs of the plant at the original (and only known) station, but in mid-June he, Mr. Long and I secured a good series, with flowers, as always, unexpanding, well-grown fruit and circumscised and dehisced capsules.

Hypoxis Longii, therefore, has capsules of the most extreme type described by Baker, who defines only a few species, all in his subgenus *Ianthe*, suggesting it: "capsula turbinata membranacea infra collum circumscissa" (*H. stellata* from the Cape of Good Hope); "Capsula . . . medio circumscissa, demum irregulariter trivalvis" (*H. pusilla* of New Zealand, Tasmania and Australia); and "Capsula . . . infra collum circumscissa, valvis haud dehiscentibus" (*H. glabella* of Australia and Tasmania). The subgenus *Ianthe*, known to

Baker only from the Australian region and South Africa and containing some species with capsules dehiscent into 3 valves, has basifixed anthers; Baker's subgenus *Euhypoxis*, containing the bulk of the genus, has them versatile. It is, therefore, of the highest significance that mechanical opening out of a flower (fig. 3) of *H. Longii* exposes the basifixed anthers of *Ianthe*.

In Miss Brackett's detailed *Revision of the American Species of Hypoxis*,[1] she recognized only one species in America with the basifixed anthers of subgenus *Ianthe*. This was the very rare *H. sessilis* L., which has a large open yellow perianth. In her account Miss Brackett quoted from a letter from M. A. Curtis to Asa Gray, written in September, 1853, accompanying over-mature autumnal material of *H. sessilis* from Society Hill, South Carolina: "I send also an abortive Hypoxis now not uncommon here as a second growth of the season. Flowers 3-cleft, white." Miss Brackett also referred to material of *H. sessilis* sent by Miss Bragg from Dackon, Berkeley Co., South Carolina, June 21, 1920, as having "flowers . . . only three-cleft." Examination of the Curtis and the Bragg material clearly shows that what Curtis took for "abortive" 3-cleft white flowers and what Miss Brackett evidently so interpreted are the dehisced and empty capsules. *H. sessilis*, therefore, like *H. Longii*, belongs to subgenus *Ianthe*, not only in its basifixed anthers, but in its circumscissile capsules which soon split into 3 membranous valves. The seeds are very similar in both, olivaceous and covered with a closely reticulate iridescent testa and with the rostrate hilum lateral, instead of subterminal. The distinctions between the two follow:

H. sessilis. Perianth expanding, with rotate limb 1.5–2 cm. broad, bright yellow above; sepals and petals 6–9 mm. long, 2–4 mm. broad, the sepals only sparingly pilose on the back; capsule pyriform, 3–4 mm. long, the tardily deciduous beak fully twice its length, 6–10 mm. long; seeds coarsely reticulate, golden-brown to pale olive.

H. Longii. Perianth remaining closed, when dissected open 5 mm. broad; sepals and petals 2–3 mm. long, 0.5–1 mm. broad, whitish above, the sepals with very long white appressed beard extending far beyond the tips; capsule thick-clavate, 8–10 mm. long, promptly circumscissile at summit, throwing off the beak, then promptly splitting from the apex into 3 membranous whitish valves; beak (before circumscission) about half as long as capsule, 4–5.5 mm. long; seeds olive-black, more finely reticulate.

Hypoxis Longii is known from only a single small area, where it is associated with a series of austral species of peats and damp sands: *Panicum ensifolium* Baldw., *Rynchospora rariflora* (Michx.) Ell., *R.*

[1] Rhodora, xxv. 120–147, 151–155 (1923).

Wrightiana Boeckl. and *R. cymosa*, var. *globularis* Chapm., *Lobelia Nuttallii* R. & S., etc. Search southward to the North Carolina line has thus far failed to show another colony of it. Very similarly, *H. sessilis* is an extremely scarce plant; only a few stations for it are known and in writing of the colony in Berkeley Co., South Carolina, Miss Bragg said: "I spent over an hour searching for specimens in the one locality where these were gathered but, though I am sure there were many more, I could find only two specimens with seeds. The plants are indistinguishable from single tufts of broom grass until you get down to them in back-breaking fashion." Similarly, at the one spot in Virginia where *H. sessilis* has been found (Dam Neck, Princess Anne Co., *Fernald & Griscom*, no. 4368), a few miles south of the colony of *H. Longii*, Mr. Griscom and I found a single individual in May, 1935. Search then and again in June has failed to bring to light a second plant. We took the flowering top and left the corm! As last remnants on the Coastal Plain of North America of the ancient flora now concentrated in Australia no better illustrations could be found than these members of *Hypoxis*, subg. *Ianthe*.

Habenaria cristata (Michx.) R. Br. Occasional in sandy woodlands: Cape Henry, no. 3878; Dam Neck, no. 3879; Munden, no. 3880; abundant in wet, peaty clearings in woods of *Pinus serotina*, south of Grassfield, no. 3881.

Pogonia ophioglossoides (L.) Ker. Occasional in boggy swales and peaty depressions: Rifle Range, no. 3876; False Cape, no. 3877.

Goodyera pubescens (Willd.) R. Br. Occasional in rich woods: Little Neck, no. 3871.

Liparis liliifolia (L.) Richard. Occasional in rich woods: Little Neck, no. 3869, also *F. G. & L.*, no. 4623; Great Neck, *F. & G.*, no. 4375.

Malaxis unifolia Michx. Scattered, usually as 1 or few individuals, in rich woods: Little Neck, no. 3870; Back Bay, *F. G. & L.*, no. 4622.

(To be continued)

The Waning of Arceuthobium at Concord, Massachusetts.—An interesting chapter in local botanical history has just been closed by the extinction of the recently discovered station for *Arceuthobium pusillum* Link at Concord, Massachusetts.[1]

Writing of the black spruces at this precise locality, under date of February 12, 1858, Thoreau remarks:

[1] Rhodora, **33**: 92 (1931).

> About the ledum pond hole, there is an abundance of that abnormal growth of the spruce. Instead of a regular free and open growth you have a multitude of slender branches, crowded together, putting out from the summit or side of the stem and shooting up perpendicularly with dense, fine wiry branchlets, and fine needles which have an impoverished look, all together forming a broom-like mass very much like a heath.

Obviously, Thoreau saw but failed to discover what was perhaps the rarest plant in Concord, and which remained unknown to science until 1871. Little did he suspect that under his very eyes was the dwarf mistletoe, occurring along the southeastern limit of its range.

In any event, the owner of the small pond hole where this interesting plant grew has cleared away most of the surrounding vegetation with a zeal comparable to that of the director of the E. R. A. himself. However, he did spare the single infected spruce at the request of a botanical crank who happened by. Unfortunately, his forbearance was of no avail. The lonely spruce, succumbing to the pitiless glare of unaccustomed publicity, has died within the last few months, carrying the mistletoe with it to its grave.—R. J. Eaton.

Another New Jersey Station for Najas gracillima.—Abundant with *Najas flexilis* in a pond hole east of Cedar Lake, Denville (*Svenson* no. 5477). The only previously known locality in New Jersey is "Delanco, mouth of Cooper's Creek, Palatine, Woodstown," cited by Stone (Rept. N. J. State Mus. 1910. 166 (1911)), a station sixty miles to the southward.—H. K. Svenson, Brooklyn Botanic Garden.

Two Range Extensions.—The finding of *Betula nigra* L. in the township of Barrington, Strafford County, New Hampshire, and *Krigia virginica* L. on Georgetown Island, Sagadahoc County, Maine, both give northeastern extensions of range.

The Red Birch was discovered by the writer in 1931 on the gravelly eastern shore of Mendum's Pond. One large living tree is present and a considerable number of smaller ones, none of which is more than a few hundred feet from the parent. The only station previously reported for the state is Beaver Brook, Pelham (*F. W. Batchelder*). This stream is a tributary of the Merrimac River and is only a few miles over the Massachusetts state line. Mendum's Pond is over thirty miles northeast and drains into Great Bay.

The writer chanced to see the inconspicuous *Krigia virginica* while collecting Lecheas. The habitat was a rocky roadside in the partial shade of *Picea* sp. and *Abies balsamea*. The nearest recorded station is in the township of Wells, Maine, at least fifty miles southwest of Sagadahoc County.

Specimens have been placed in the herbarium of the New England Botanical Club.—A. R. Hodgdon, Gray Herbarium.

NOTES ON SOME RARE PLANTS OF YORK COUNTY MAINE

Anne E. Perkins

Having returned to Berwick, York County, Maine three years ago, after a long absence, I have been giving considerable attention to the natural history of my native county and state. Among the many plants which I have collected these few years are a number of species of rare occurrence in Maine, which some of my correspondents have urged me to report. Specimens of some of these species have been sent to Gray Herbarium, and to the Portland Society of Natural History, and all of my York County specimens are in the Herbarium of Cornell University.

Thelypteris hexagonoptera. Waterboro, York County, has a large station of this fern.

Carex vestita. This sedge literally invests whole marshes at Wells Beach.

Juncus Torreyi. In September 1932, I found a large station of this rush just above the shore of the estuary of the Salmon Falls River in South Berwick. During the season of 1933, I found very little of the plant, as the entire piece of ground was ploughed, the first time that I have known it to be disturbed. During the season of 1934 the plant had disappeared.

Iris prismatica. This still occurs freely on the marshes of Wells Beach.

Acnida cannabina. This occurs in profusion in the estuary of the Salmon Falls River at South Berwick.

Anemonella thalictroides. This plant, which I have every reason to know grew formerly in Berwick has not yet been established in Maine by a specimen. There is a patch of it in New Hampshire just across the river from South Berwick, not a long stone's throw from South Berwick.

Cimicifuga racemosa. This I have collected twice in North Berwick in woods not far from Bauneg Beg Pond, and also by the wayside.

Podophyllum peltatum. A large circle of this plant in a pasture in Alfred, planted there many years ago by the Shakers who had a

colony there for many years, thrives and appears year after year. It is not known to have spread from the original planting.

Sassafras variifolium. Occurs freely in North Berwick, Sanford and York. I recall it from childhood in Sanford and North Berwick, and at present in both places there are some of the largest trees that I have seen anywhere. At Oak Hill, Sanford it is plentiful on the property of Herbert Allen; his father used to make stanchions of the wood in his barn.

Benzoin aestivale. This I found in Eliot in 1934, and though through the cutting of bushes all of the large plants were cut, there are now quite a number of young sprouts appearing by the road side. This had not been found in forty years. It was reported in York County by Dr. Aaron Young in 1847, and about forty years ago it was collected in North Berwick by John C. Parlin.

Tillaea aquatica. Collected in the estuary at South Berwick in 1934.

Cytisus scoparius. Apparently established at Perkins Cove, Ogunquit in Wells. It was severely affected by the severe winter of 1933–34.

Lathyrus pratensis. I first collected this plant at Stromberg Corner, North Berwick, in 1927. It now covers a large area there.

Kalmia latifolia. A station in Wells, covering perhaps half an acre, has suffered greatly from the wanton breaking of bushes and digging of the plants by those who come miles for it. A large station of *Rhododendron maximum* in Sanford suffers similar depradations.

Samolus floribundus. Quite plentiful in the estuary of South Berwick.

Pycnanthemum flexuosum. Has grown in Berwick for many years.

Pycnanthemum muticum. I first found this plant in Berwick in August 1919; since that time it has increased. It grows along the road side less than a mile from our house.

Limosella subulata. Collected in 1934 on the estuary, Berwick.

Bidens hyperborea. Has been collected in brooks in Berwick and along the Salmon Falls River at South Berwick.

Berwick, Maine.

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